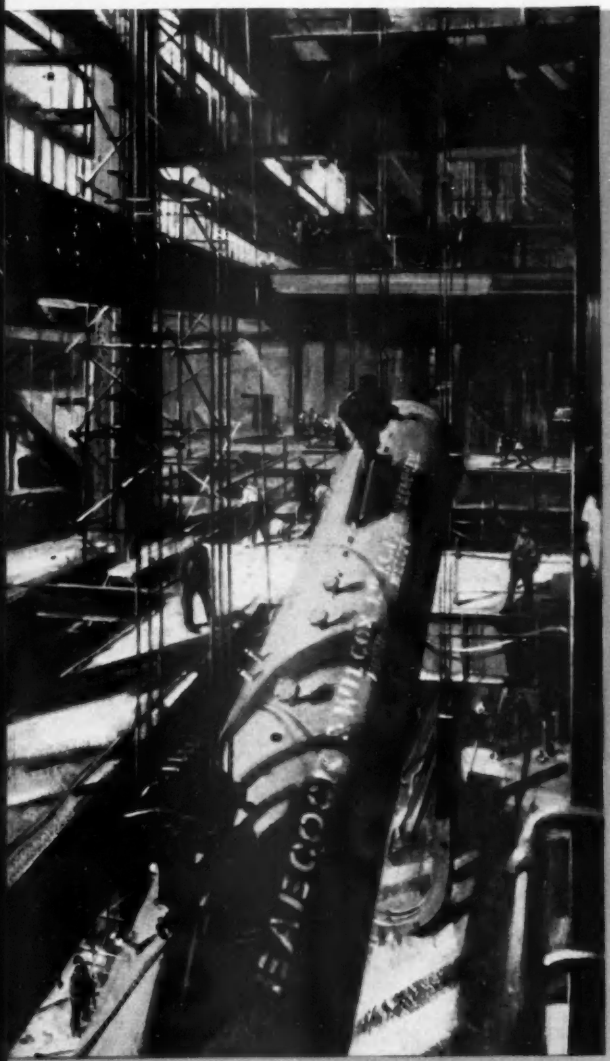
ELECTRICAL TIMES

THURSDAY
19 NOV.
1953
NINEPENCE



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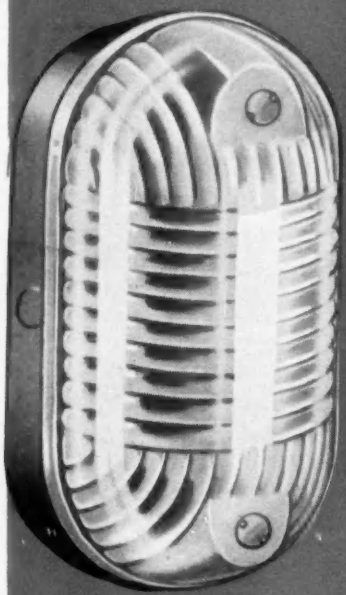

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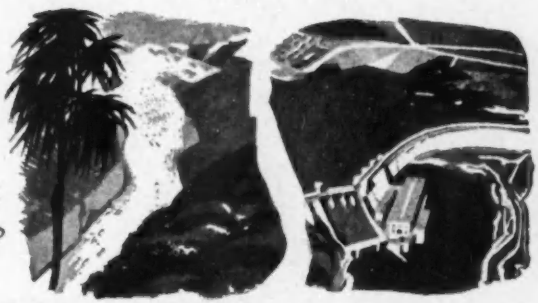

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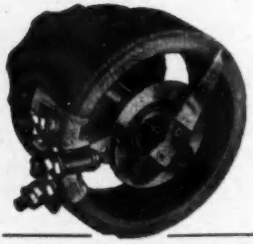

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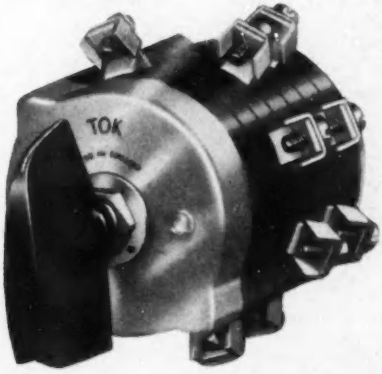

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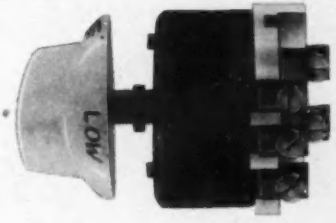

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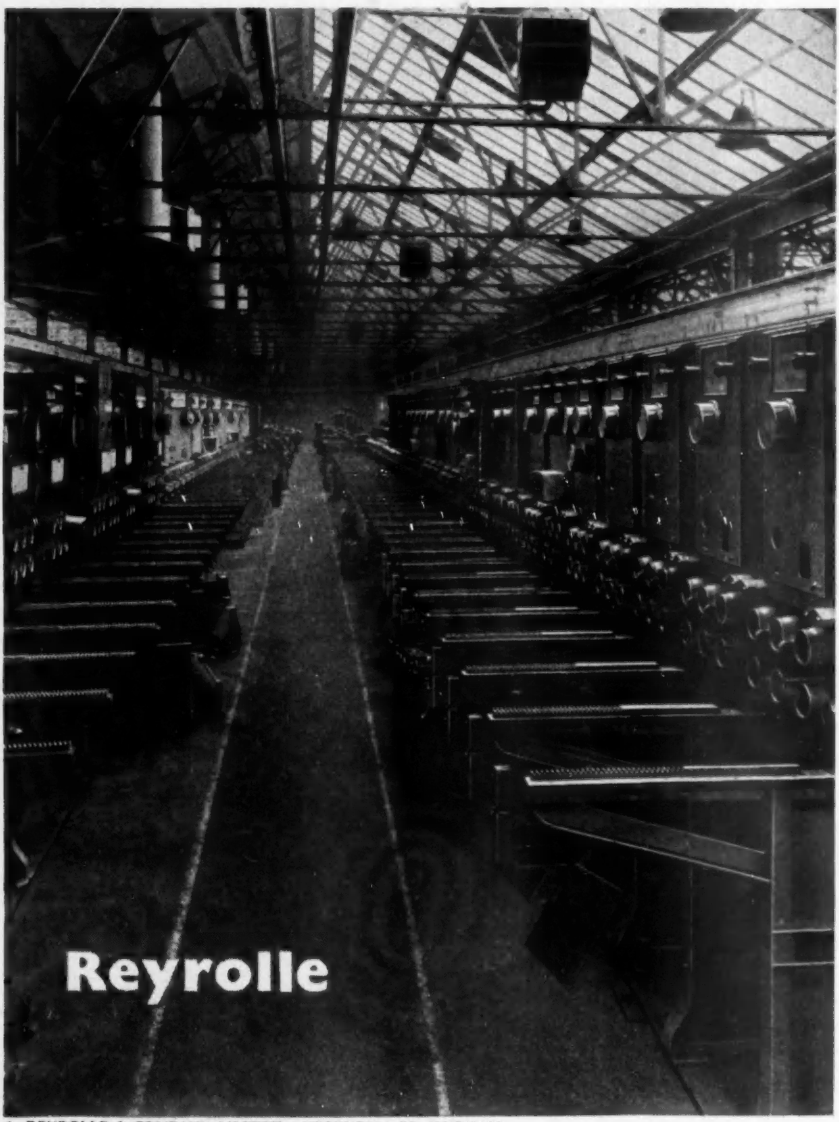

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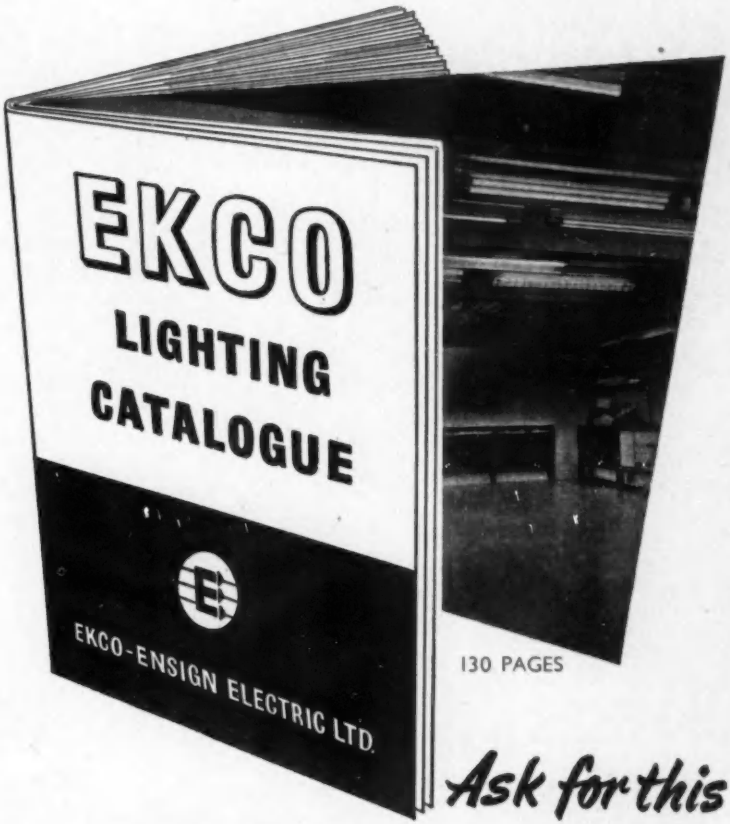

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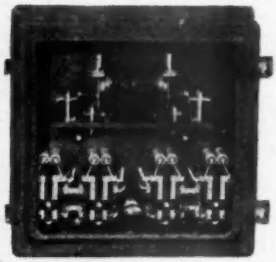

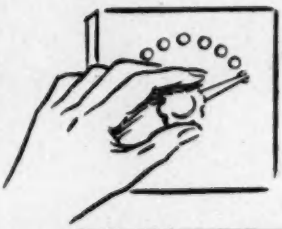

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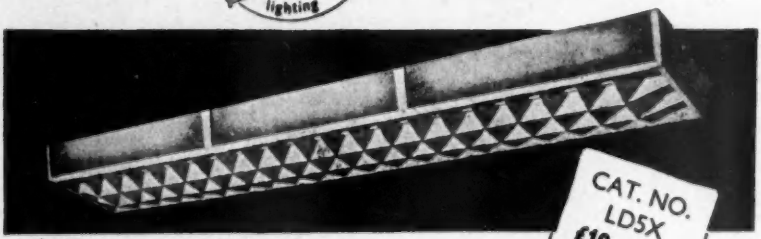

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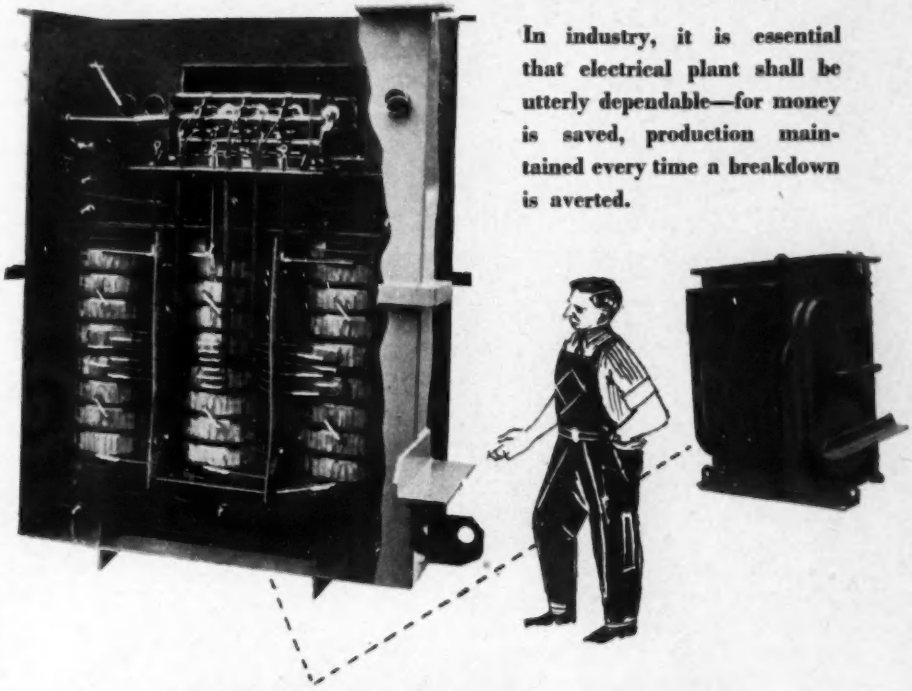

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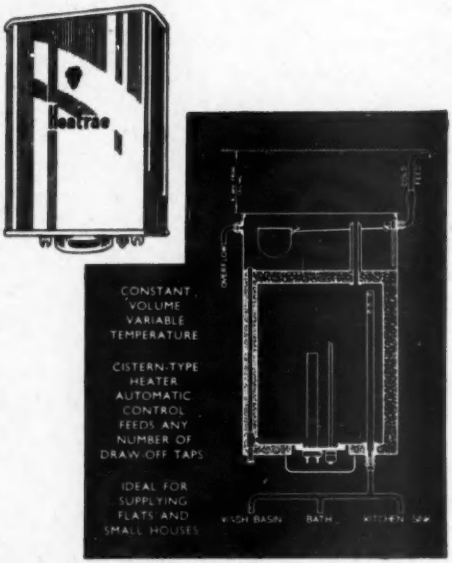

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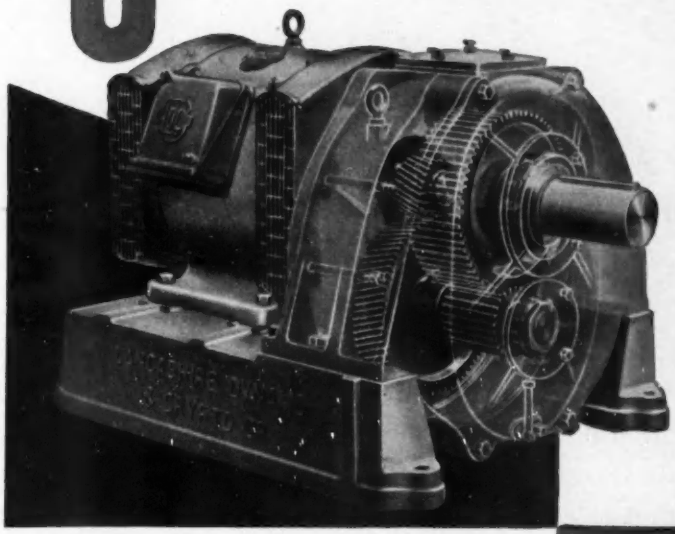

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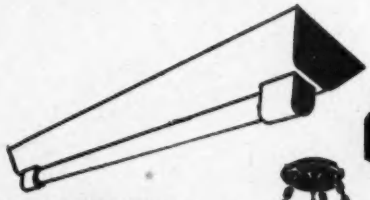

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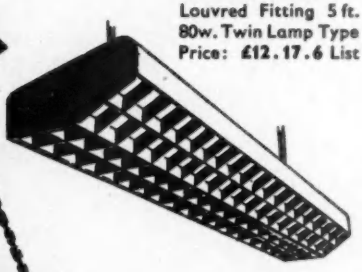

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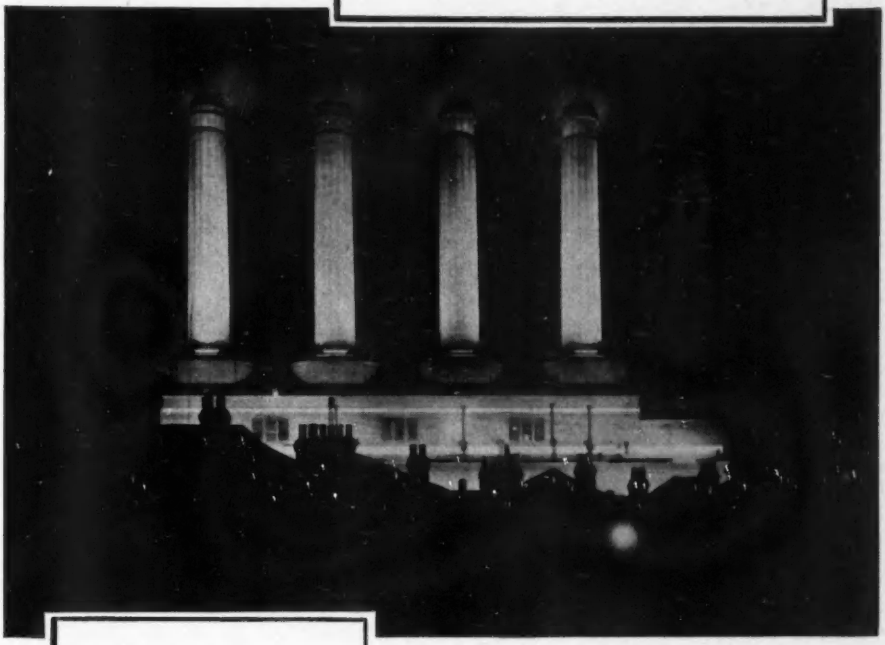

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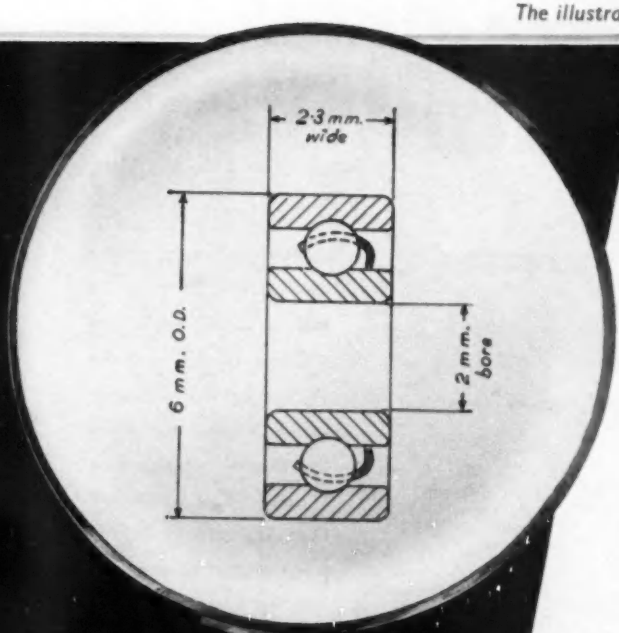

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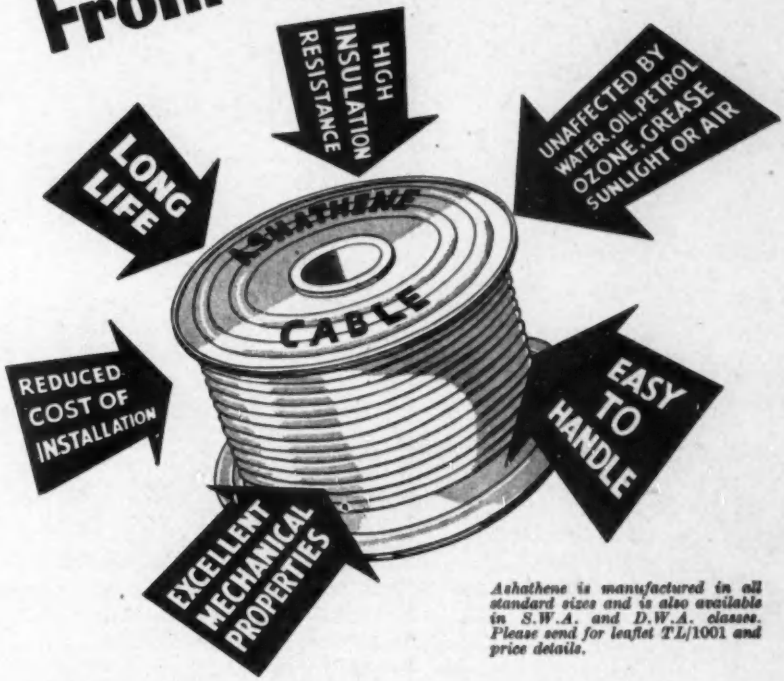

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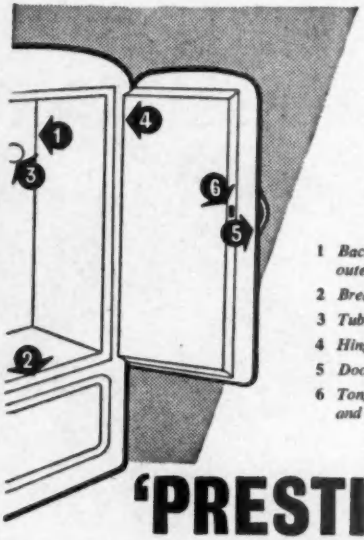

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'PRESTIK' provides an easy and efficient means of sealing against moisture; it is non-corrosive and withstands extremes of temperature.

'PRESTIK' and 'BOSTIK' together can provide the answers to your adhesive and sealing problems. Call the 'BOSTIK' man for advice on the manner in which 'PRESTIK' and 'BOSTIK' products can help you.

PRESTIK
SEALING STRIP

manufactured by the sole proprietors:

B. B. CHEMICAL CO. LTD
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Lighting at the touch of a button

"Rythmatic" ripple control offers the street lighting engineer all the facilities he requires. One of the most important is that he can select lamps or groups of lamps for half-night, all-night and prior-dawn switching. He has also a "push-button" centralized control over the whole network from his H.Q. and can perform a desired switching operation at any time of the day or night—all selected lamps being affected simultaneously. The existing power circuits provide the signalling medium and the "on" and "off" timings are not disorganised by power cuts. The control switch requires no routine adjustment and has been designed to fit almost any type of housing.

The power engineer also benefits from "Rythmatic" ripple control for it enables him to improve his load factor. When used to its fullest advantage "Rythmatic" ripple control is a profitable investment for all concerned.

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Strowger Works, Liverpool, 7

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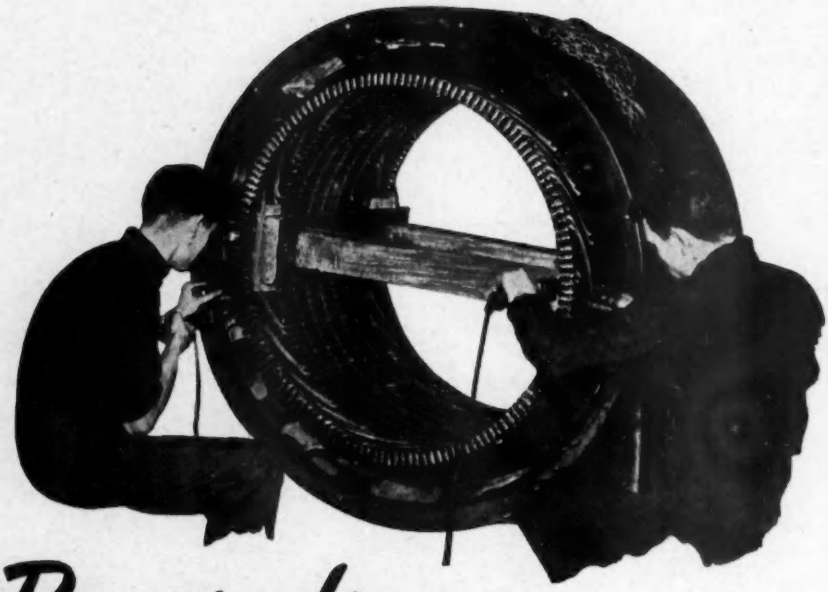

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We may not be Britain's largest electrical and mechanical repairers (we don't know), but we do have:—

Over 30 years' experience.

A staff of over 150 to give you speedy and efficient service.

A design department under the supervision of Chartered Electrical Engineers.

A large machine shop equipped with a comprehensive range of very modern machine tools.

An inspection and test department approved by the A.I.D.

Remember then, for a quick, efficient service . . .

GRAngewood 4003 (4 lines)

BROWNING'S ELECTRIC CO. LTD.

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"One of the most attractive Christmas gifts ever produced!"

MODEL 2570
400 WATT.

Overall width 29¼" depth 15½" height 4¼".
Beautifully made heavily plated frame and ingenious heater element metallized between toughened glass panels.
Fitted with switch, flex and pilot light.

All 'ENGLISH ELECTRIC' DEALERS should make sure they are well stocked with the outstandingly popular

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PLATEWARMER

BRINGING YOU BETTER LIVING

The ENGLISH ELECTRIC Company Ltd., Domestic Appliance Division, East Lancashire Road, Liverpool 10

See also the English Electric advertisements which appear on pages 65 and 71 of this issue

When it's a question of

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ask for "ASHLAM" Laminates

"ASHLAM" laminates are produced from paper, cotton fabric and fibreglass base materials. The fibreglass grades are bonded with Silicone, Melamine, Phenolic and Polyester type resins, and have very high dielectric and insulation properties.
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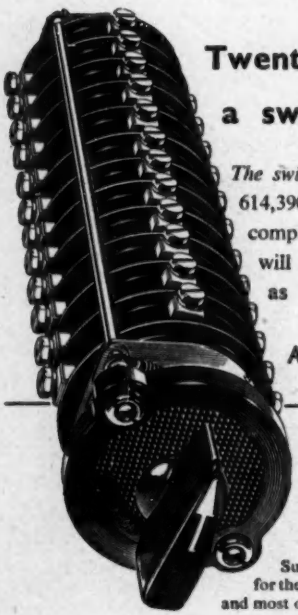

Twenty-four 22.5 kVA Circuits on a switch that will lie in your hand

The switch is a 6 cell Austinlite 50. Its 24 pairs of contacts provide 614,390 different switching combinations—which gives some idea of the complexity of the circuiting these switches handle. The smaller A30 will handle up to forty-eight 7.5 kVA circuits—and is as versatile as the A50. Send for illustrated leaflet giving full particulars.

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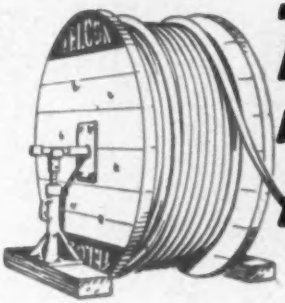
Lighthouse Works, Smethwick 40, Birmingham. West Bromwich 1824
London Office: 28 St. James's Square, S.W.1. Whitehall 6002

Austinlite switches are used and specified by:
The Admiralty; British Electricity Authority; The Air Ministry; Ministry of Supply; British Broadcasting Corporation; General Post Office; Crown Agents for the Colonies; National Physical Laboratory; Royal National Lifeboat Institution, and most of the leading electrical manufacturers in Great Britain.



TELCON

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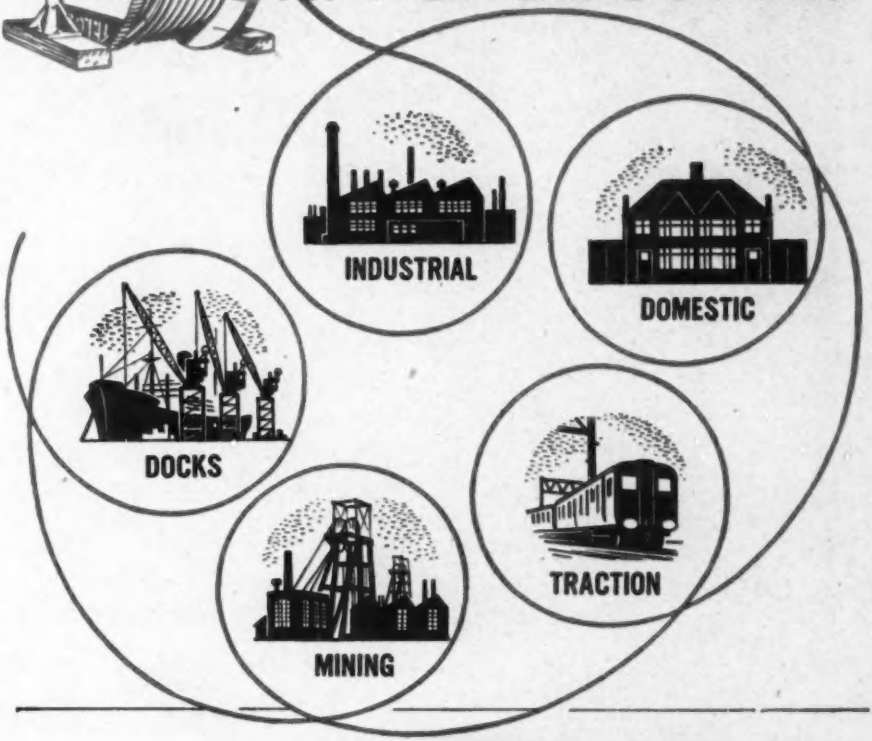

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THE TELEGRAPH CONSTRUCTION & MAINTENANCE CO. LTD.

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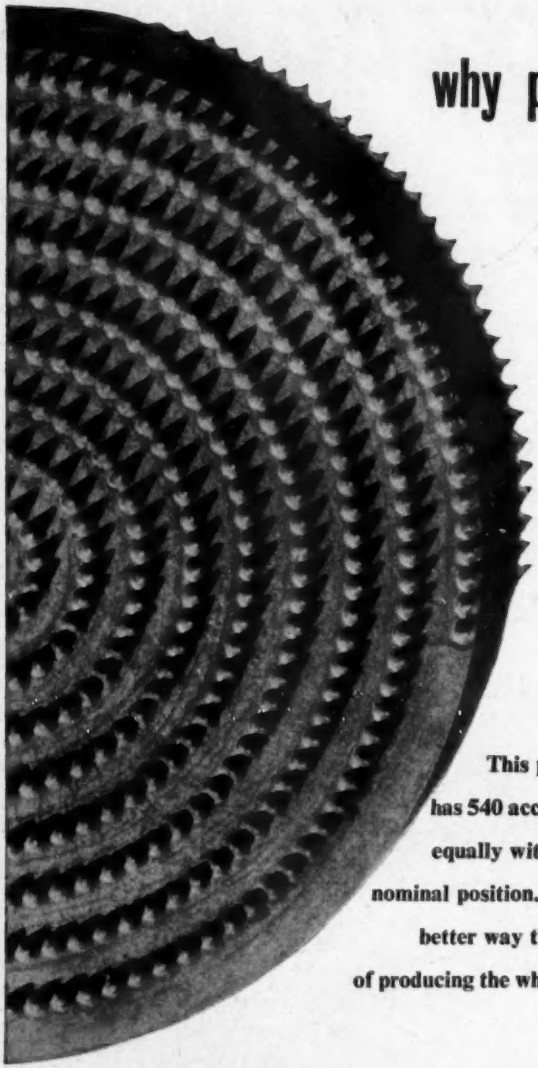

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This part for a potentiometer has 540 accurate projections spaced equally within limits of ± ·001″ of nominal position. Can *you* think of any better way than pressure die casting of producing the whole *in one operation*?

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INSULATING TAPES

FOR EVERY ELECTRICAL INSTALLATION **BICC** *and*

JOINT BOX COMPOUNDS

BICC supply nearly a score of different types of Insulating Tapes and Joint Box Compounds. This wide selection enables electrical engineers to choose materials of the correct characteristics needed for any particular insulating or jointing job. Full information on these products is available on request.

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DEPENDABILITY

Typical Unit Type 'Y' Switchboard incorporating fuse switches and metalclad oil circuit breakers in back-to-back layout with central cable trench. Continuity of supply is vital, 'Y' Gear gives it in safety. For indoor or outdoor use.

Illustration indicates first stage installation to be followed by duplication of fuse switches in back-to-back formation.

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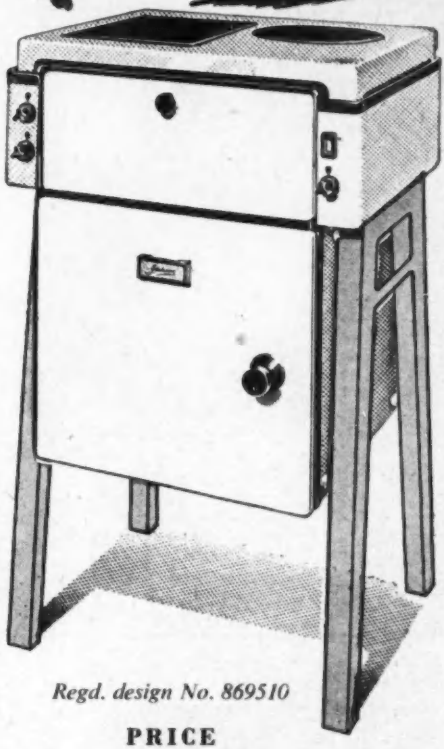

Regd. design No. 869510

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The Family Electric Cooker with

- ★ Extra robust construction
- ★ All the features demanded by women
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DEMONSTRATE THESE FEATURES

Light weight lift off hob
Specially designed spillage channels
Hand level controls
Fully accessible hob assembly
Built in towel rails
Large capacity oven (24lb. turkey)
Complete unit wiring assembly
Rollers on rear legs for easy movement
Light colour enamel for oven interior

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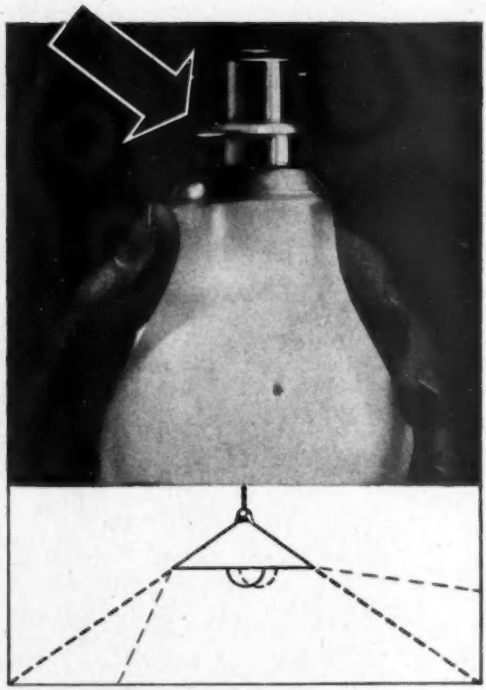
Nothing left to chance . . .

CAP AXIALITY

Correct distribution of light with Royal "Ediswan" Lamps is ensured because perfect alignment between the cap and the glass envelope is achieved during assembly.

The incorporation of a "register" accurately moulded into the glass during manufacture of the lamp makes correct fitting of the cap automatic.



This is but one example of the intricate operations in the manufacture of Royal "Ediswan" Lamps, calling for the highest degree of technical skill and the utmost care and precision. Nothing is left to chance—*only the finest materials are used and there is strict control at each stage of manufacture.*

BY APPOINTMENT

ROYAL "EDISWAN" LAMPS

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Member of the A.E.I. Group of Companies

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INSIST ON Grubb **HEATING UNITS**

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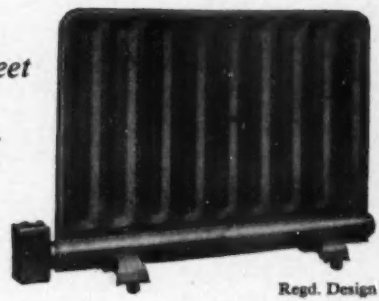
Economy : **EFFICIENCY** : *Service* : **SATISFACTION**

AUTOMATIC "plug in" RADIATORS

With Castors, "Silent Dome" Feet or for Wall Mounting



RATING:
500 watt
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1,000 watt
1,500 watt
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OUTSTANDING FEATURES:

1. **Robust, Manoeuvrable, Economic.**
2. **Available in a complete range of sizes, ratings and colours.**
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5. **DOUBLE TOWEL RAIL attachment, finished in SUPER CHROME available at £1/1/- plus 11/3 pur. tax extra.**

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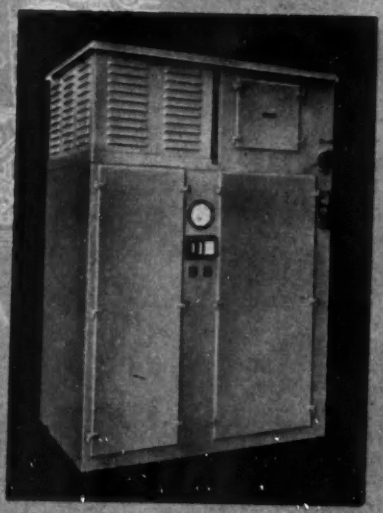
GRUBB ENGINEERING COMPANY LTD. **BIRMINGHAM 12**

CONTACTOR SWITCHGEAR LTD
WOLVERHAMPTON ENGLAND

Automatic Motor Control Gear



For High Tension Machines

One of a number of 300 H.P., 3,800 volts, 3 phase Stator and Rotor Starters controlling Slipring Motors driving rubber mills and embodying an emergency plug stopping feature.

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The claims we make for the ARON TYPE eP1 PREPAYMENT METER are

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THE meter element and prepayment mechanism have been long established and are well known for their reliability. A simple rate change mechanism is incorporated in the meter which enables the rate to be changed in a moment on site without special tools and in order to eliminate the possibility of mistakes the rate is charged in "price per unit" steps, with a clear indication of the operating price. Money in credit is immediately charged at the new rate.

The switch has double contacts and can take and break a maximum load without failure over the whole life of the meter. It is housed in all-insulated case with double barrier insulation to the coining unit.

We can also offer the unique facility whereby all our earlier type of eP prepayment meters manufactured since 1932 can be modernised including fitting a variable rate change mechanism and double contact switch for a nominal charge.

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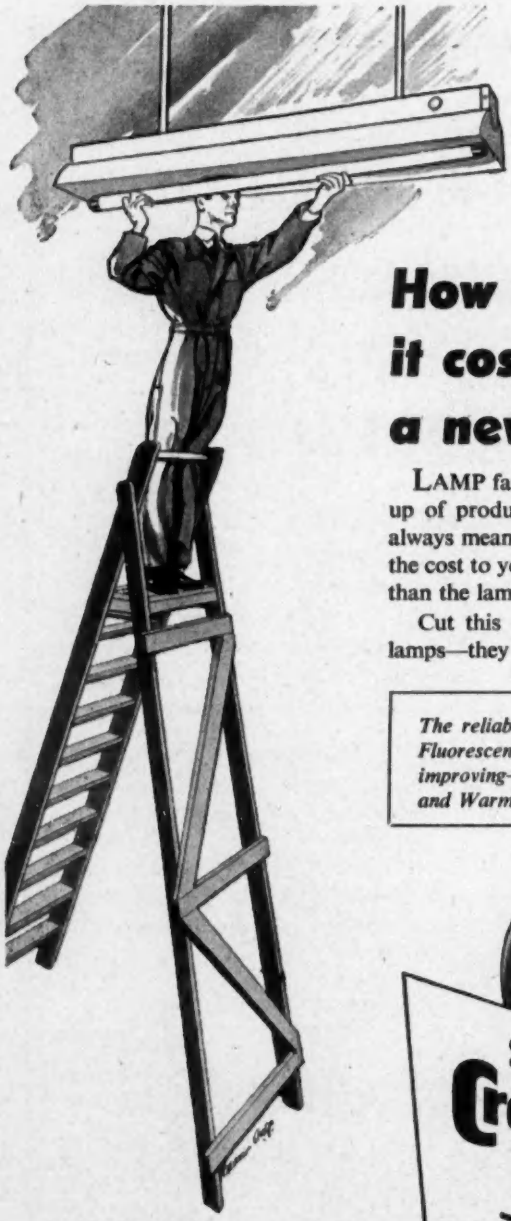

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How much does it cost you to fit a new lamp?

LAMP failure often means a temporary hold-up of production in office or works. It nearly always means a job for the electrician. Together the cost to you of replacing a lamp is much more than the lamp value.

Cut this overhead cost by fitting Crompton lamps—they have a long and efficient life.

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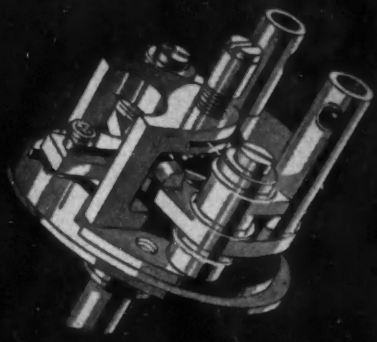
ELECTRICAL EQUIPMENT

Water heater thermostat

WITH A DIFFERENCE



An all-in-one-piece electrical circuit (instead of innumerable screw contacts) . . . a positive action Simmerstat-type switch — sooner or later these are going to make a difference to your maintenance costs . . . . . ?

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Domestic temperature controls

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The Homeberry

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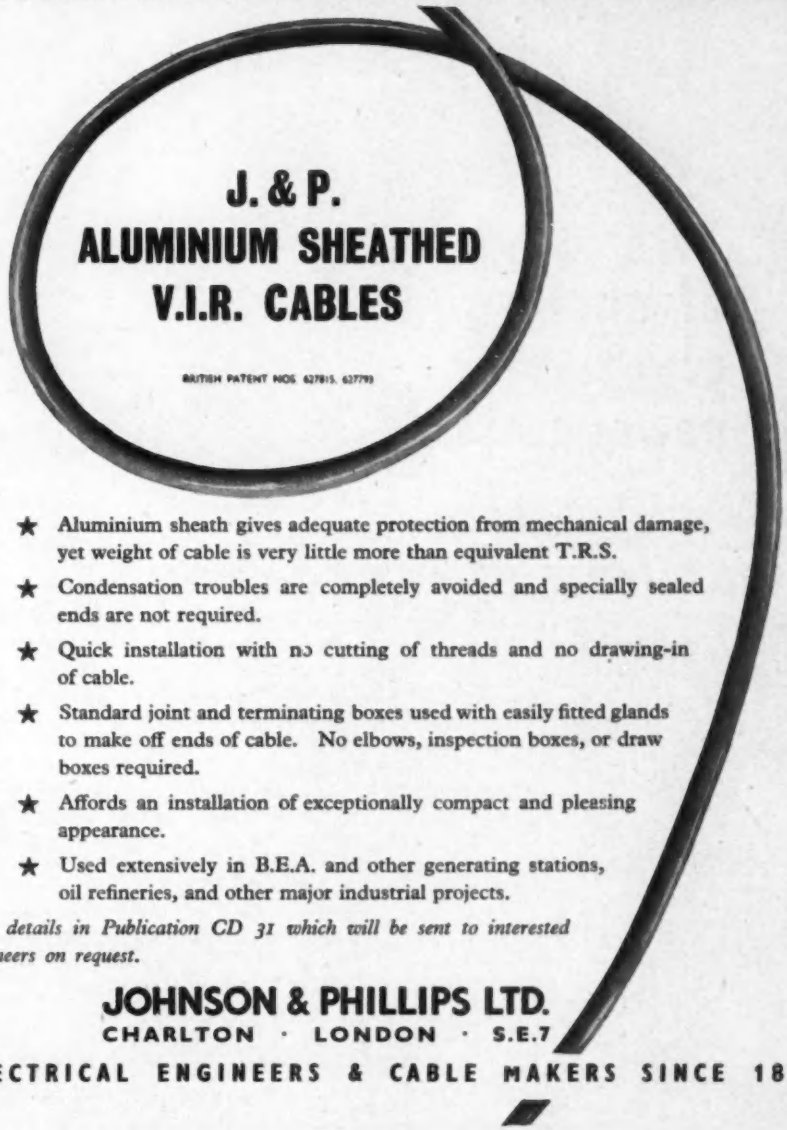
...the cable with a conduit sheath



J. & P.
ALUMINIUM SHEATHED
V.I.R. CABLES

BRITISH PATENT NOS. 627815, 627793

★ Aluminium sheath gives adequate protection from mechanical damage, yet weight of cable is very little more than equivalent T.R.S.

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★ Standard joint and terminating boxes used with easily fitted glands to make off ends of cable. No elbows, inspection boxes, or draw boxes required.

★ Affords an installation of exceptionally compact and pleasing appearance.

★ Used extensively in B.E.A. and other generating stations, oil refineries, and other major industrial projects.

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ELECTRICAL ENGINEERS & CABLE MAKERS SINCE 1875

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Two ways of cutting electricity power costs

Ferranti Power Factor Correction Capacitor

MAXIMUM DEMAND ALARM

Ferranti Maximum Demand Alarm

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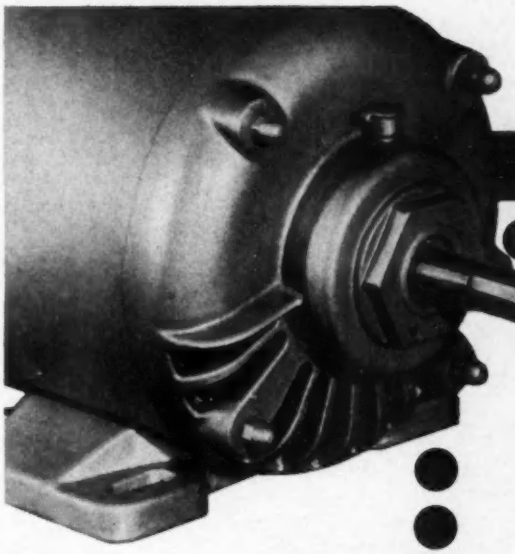

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Take your choice

at no extra charge

No other manufacturer offers ball bearings at the same price as sleeve type. **"Gryphon" motors are competitive in price. Can we send you further details?**

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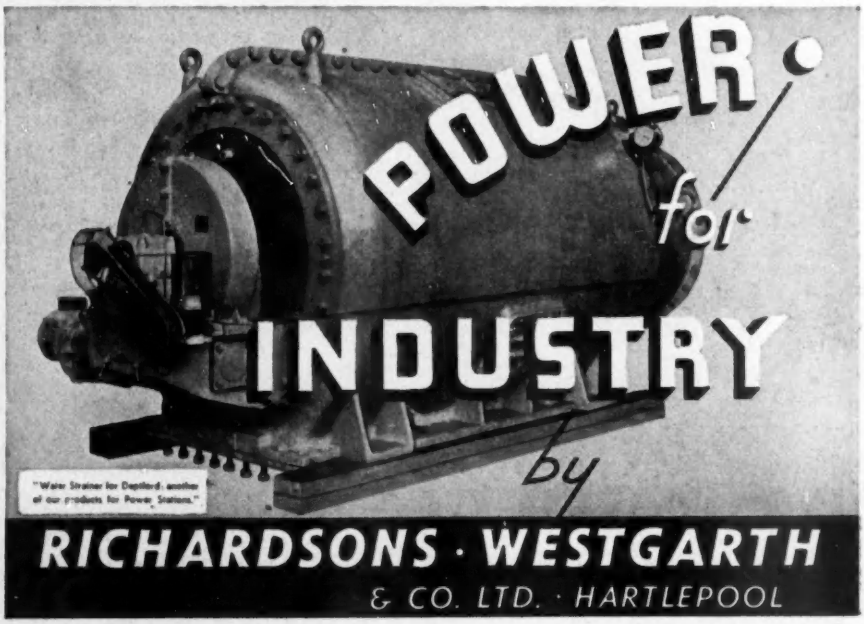

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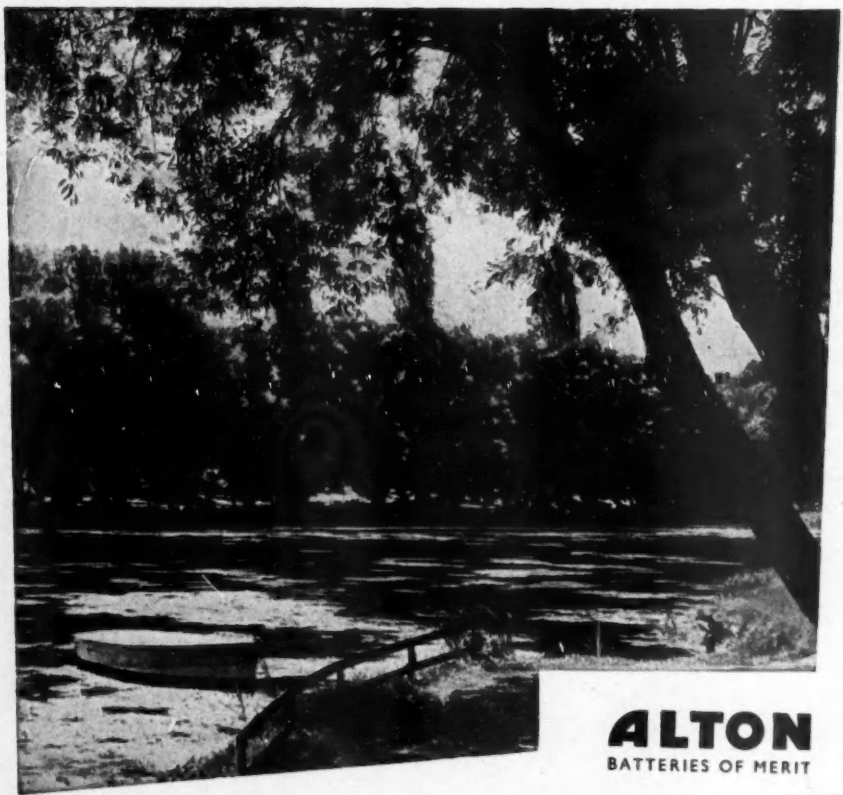

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Whatever your needs, if you buy cables from a C.M.A. member, you can be certain that you are getting a product of proved and tested quality — cables which are made to the world's highest standards.

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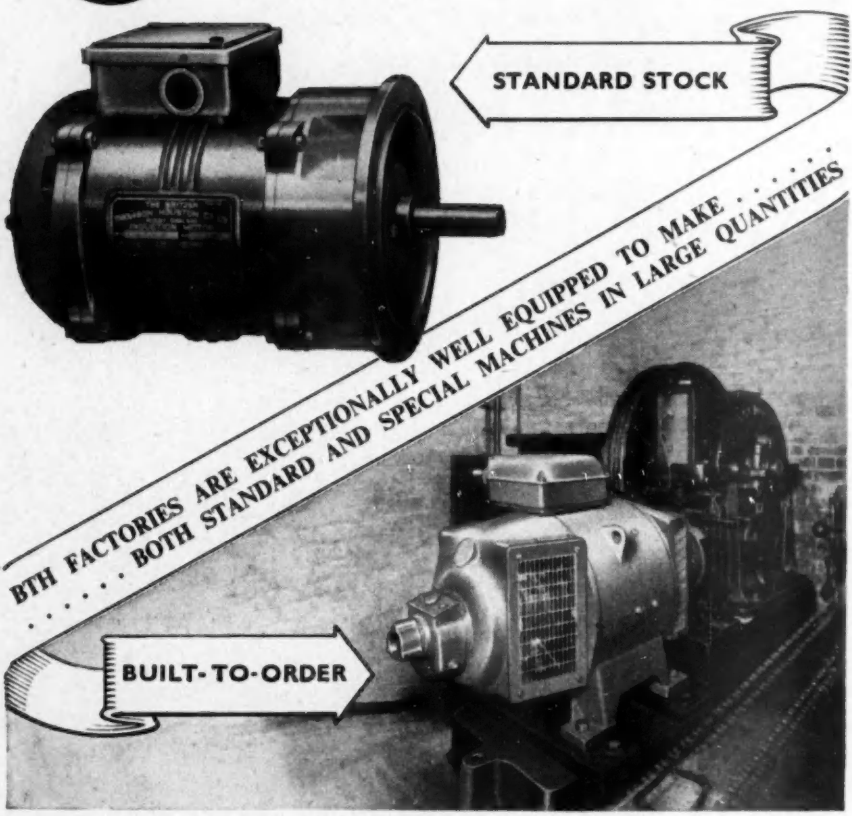
Wheels of industry the world over are turned

by B T-H **ELECTRIC MOTORS**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BTH FACTORIES ARE EXCEPTIONALLY WELL EQUIPPED TO MAKE . . . . . BOTH STANDARD AND SPECIAL MACHINES IN LARGE QUANTITIES
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AC or DC

No manufacturer can offer a wider choice of electric power unit than BTH whose Trade Mark is accepted by manufacturers and users as a symbol of advanced design and proved performance, with years of trouble-free service. Remember! A *BTH* power-engineer has no incentive to recommend anything but the correct motor for the job—be it 'standard' or specially built to your requirements.

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What is the

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cost of re-lamping a Watertight Fitting?

When a lamp goes, as even the best lamp will, then re-lamping is only a moment's job. In the R.E.A.L. Fitting **there is nothing to corrode!**

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THE ONLY ONE-PIECE SCREW-NECK WATERTIGHT FITTING

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5 ft. 80 w. OPEN TROUGH CAT. ST/80/5

Superior white-stoved enamel finish. Incorporating Smart and Brown standard control gear with tapped chokes 200/250 volts.

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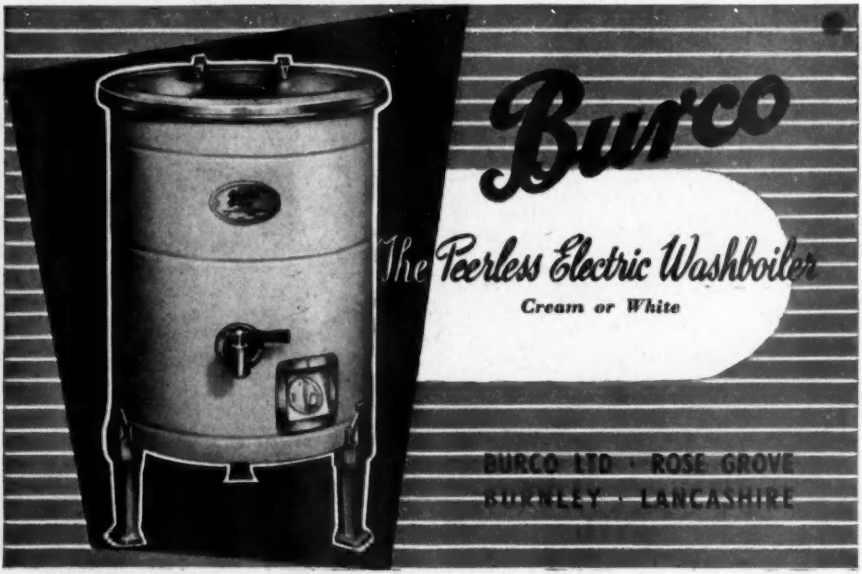

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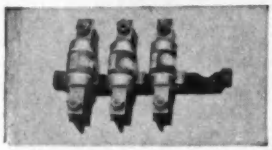
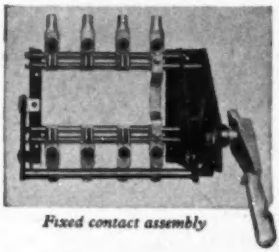


Moving contact—fuse assembly



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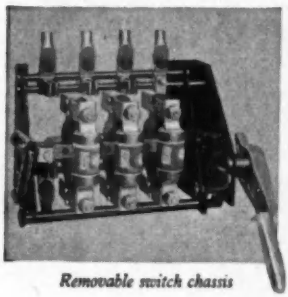

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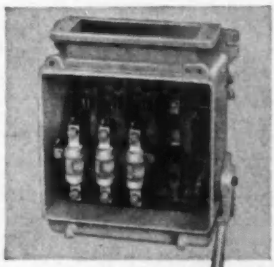

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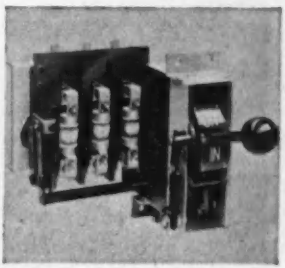

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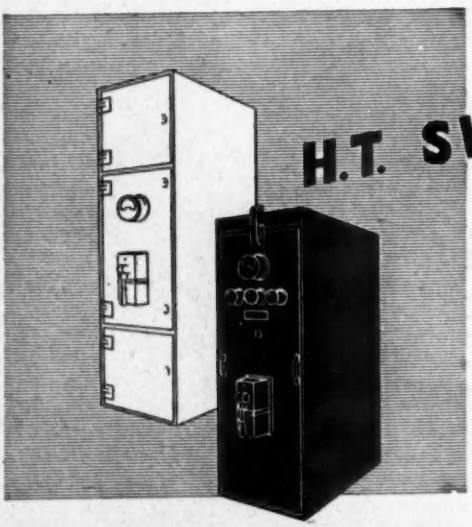

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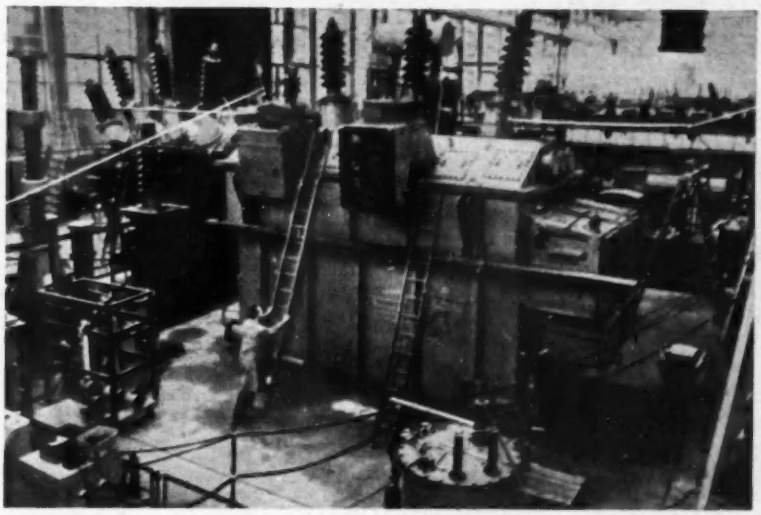

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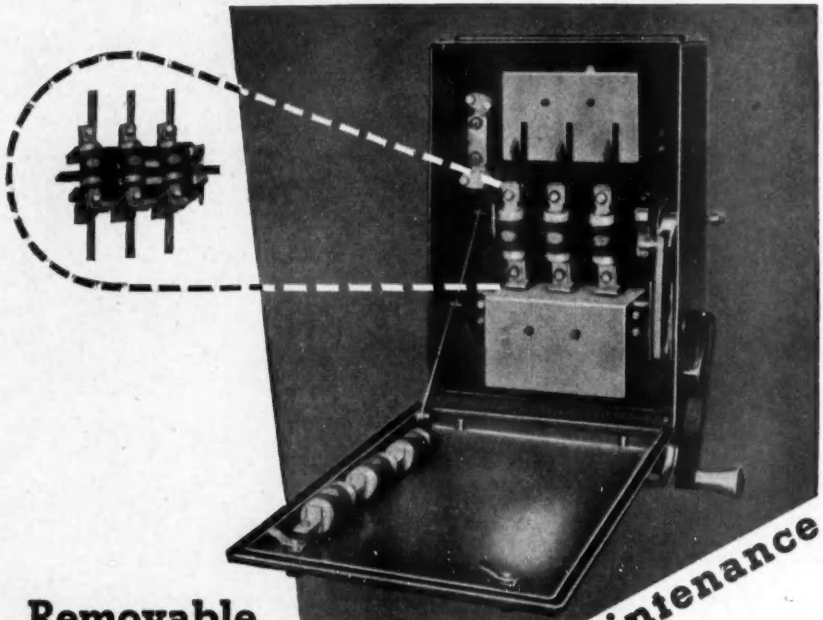

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ELECTRICAL TIMES

Volume 124 No. 3237 19 NOVEMBER, 1953

PUBLISHED EVERY THURSDAY

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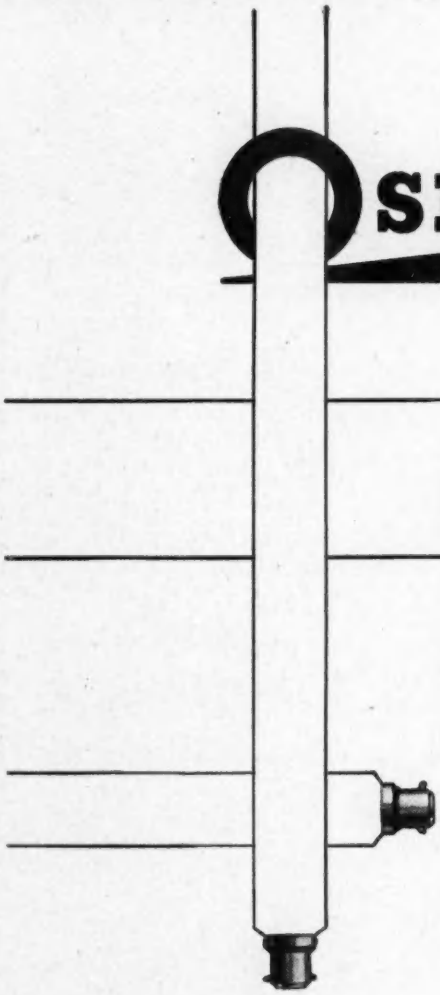

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Editorial

ATOMIC CONTROL

IT now seems reasonably certain that by the end of the present century, the projected British Atomic Energy Corporation will have replaced the N.C.B. as the most important supplier of fuel to the British Electricity Authority. The form in which the new Corporation is organised will inevitably affect the rate of progress towards this desirable end, and if the recent Government White Paper on the subject is examined with this consideration in mind, the prospect must give rise to some concern. Although the new Corporation is described as "an organisation run on industrial lines", this happy concept suffers from the serious disadvantage that for many years the Corporation will have nothing to sell. Until the reactor programme gets well under way, there will be heavy expenditure with few receipts, and public money will be spent in very large amounts. Inevitably, there is to be Parliamentary control of this spending, and with it that exposure to investigation which can so fatally hamper individual initiative. Although there is to be some relaxation of normal departmental methods of financial control, the strongest leadership by the functional members of the Corporation's board is going to be necessary if progress is to be continued as swiftly as the situation demands.

A BOOMERANG

WITH the approach of December, the thoughts of many Londoners are turning toward the possibility of a recurrence of the "smog" disaster of 1952. Nothing has been done to reduce the circumstances fundamentally responsible for the killing nature of the fog, and should the same atmospheric conditions recur, there can be no doubt that it will be as severe as it was last year. That the authorities are well alive to the danger, can be seen from the recommendations suggested by the Rivers and Drainage Committee of the L.C.C. and by the paper presented to the Royal Sanitary Institute by Dr. Wilkins of the Fuel Research Station. Both these documents place the major responsibility for pollution on the domestic consumer of bituminous coal, and the all-night burning grate is singled out for special mention. The recommendation is made in both cases that smokeless fuel should be used in these grates, although as the L.C.C. Committee points out "the use of smokeless solid fuel will not, however, result in any material reduction of the sulphur compounds". The realisation of this solution is, however, practically impossible due to the shortage of the smokeless fuel for which these fires were specifically designed. It is perhaps remarkable how the early official praise with which these grates were introduced has, in the light of experience, given way to doubts on their efficiency, their coal saving and now on their contribution to cleaner living.

ELECTRO-MEDICAL SAFETY

BOTH in surgery and medicine, applications of electricity have advanced a long way in recent years. With the physicist becoming a normal member of the hospital team, the charlatanism and chromium plate which successively marked the earliest applications of electricity in this field have largely disappeared. Yet these antecedents have left their mark. Supplying the electrical requirements of doctors and surgeons remains a strongly competitive trade, and the tendency is still towards the well-looking rather than, necessarily, the soundly constructed. This point was discussed with obvious feeling at Savoy Place the other evening, when several engineers speaking for manufacturers, called for a Code of Practice on electro-medical apparatus which would establish a standard of construction and of component quality for the electronic devices involved.

Such a code would protect the more reputable manufacturer from his price-conscious competitor who uses components of doubtful life and safety. Unfortunately, a code would also have the effect of slowing down progress, but on balance some official guidance on general principles seems timely.

IMPORT QUALITY

LAST week's announcement of extensive relaxations in the regulations covering the import of electrical domestic appliances may well herald larger supplies of foreign products in our shops and stores. If this proves to be the case, then some attention will need to be given to the question of quality and safety. Considerable success has been achieved since the immediate post-war years in weeding out shoddy and dangerous appliances marketed by British manufacturers—the E.D.A. Testing House has done especially good work in this field. It would be disastrous if the progress achieved were lost because of the uncontrollable overseas competition. "British Made" and a brand name will help, as always, to provide some check on quality, but this prospect of increased overseas competition does stress again the advantages that a nationally recognised mark of quality would bring. In many instances the British Standard mark would be appropriate, but with the reputation of the E.D.A. Testing House now established, a certificate of that organisation, made freely available to manufacturers who submitted their appliances for test and periodic inspection, would be an even more valuable protection for the public against ill-designed and potentially dangerous electrical equipment.

CABLE PROTECTION

CORROSION is a problem of increasing importance in power cable engineering. In pre-war days the general use of lead as the outer sheathing gave general satisfactory results, although corrosion troubles were by no means unknown. Today the use of pressure cables for the highest voltages has radically changed the situation, by bringing in relatively thin steel reinforcement tape as an essential part of the electrical design of the cable. Much ingenuity has been devoted to developing a reasonably inexpensive protection against chemical attack on the tapes, and as a result a wide range of coverings are now available. But in applying all this effort, has the industry been giving insufficient attention to a possible electrical solution of the problem? A symposium of papers on cathodic protection which was organised last week by the Society of Chemical Industry showed how useful operators of pipe lines are finding the maintenance of a protecting potential between the pipe and the surrounding soil, which inhibits the essential electro-chemical mechanism of corrosion. The application of similar techniques to super-tension cable reinforcement does not appear to have been discussed very much, but its possibilities undoubtedly merit close attention.

SUPPLIES TO BUILDINGS

THERE are few industries in which mechanisation fails to improve productivity even when work cannot be concentrated in a central factory of workshop but has to be carried out on an open site. In cases of this sort, however, the possibilities of applying machines are not always apparent and a good deal of propaganda work is necessary to get the trades concerned to give machinery a trial. This is what is happening at the present time in the building industry. The most recent suggestion for mechanisation has in this case come from the Ministry of Housing, and contains the valuable suggestion that mains-powered electrical portable tools should be used in erecting new housing estates and large buildings. With the co-operation of electricity boards, it should be possible to obtain a supply from the cable network which will eventually feed the completed buildings. This makes us wonder why it has so far been left to the building industry and the Government departments concerned with it, to educate builders and contractors in the need for more portable power on site. Surely it is time the electricity industry took a hand as well.

Meteor

19 NOVEMBER, 1953

PROTECTING Medium Voltage Lines against LIGHTNING

By D. F. OAKESHOTT, B.Sc., A.M.I.E.E.

PART ONE

THUNDERSTORM activity is indicated by the number of days each year on which thunder is heard. In this country the number of thunderstorm-days, averaged over a large number of years, is approximately 10, the maximum annual variations being roughly ±25%. Different parts of the country suffer differing thunderstorm activity from year to year, and the map (Fig. 1) shows the average distribution over a 30-year period. The lines pass through regions having the same number of thunderstorm-days annually and are called isokeraunic lines.

Information of this sort, though essential for estimating how much trouble is likely to be experienced on a transmission line, is not of itself sufficient and must be supplemented by a knowledge of the frequency of occurrence of strokes of various amplitudes. Data on this are available and Lacey gives the distribution shown in Fig. 4. Nevertheless, it is recognised that further information is still required, and to this end magnetic link installations are maintained by British Electricity Laboratories and the E.R.A. on various tall structures such as power-station stacks and transmission towers. Strokes recorded of recent years are listed in Table 1.

The level of activity in the British Isles is relatively low and may be compared with such values as 30 in South Africa and parts of the U.S.A. and 80-90 in Florida. Nevertheless, the effects on the electrical transmission and distribution systems as a whole are by no means negligible. It is estimated that 40%[1] of all line faults on the C.E.B. Grid System were due to lightning, of which approximately half caused interruptions of supply. A higher ratio of supply interruptions to faults will occur on most of the lines under discussion in this article.

Fault Rates

Fault rates vary with system voltage, the lower voltages suffering more than the higher. For example, at 132 kV there is only one fault[1] annually/100 route miles, whereas at 11 kV there are at least six. However, the relationship is far from linear and for voltages of 20 kV and below the rate tends to become constant or only slowly increasing with falling voltage. At the other end of the scale the rate falls off to very low values for transmission voltages of 200 kV and above.

A characteristic of this sort would be expected from the fact that at the lower voltages the line insulation is more readily flashed over during storms. On the other hand, the fault rate will not, because of this, increase continuously with fall of voltage since the thunderstorm activity is finite, and also because the insulation levels are not reduced proportionately. The former factor is

TABLE 1.—Intensities of Some Lightning Strokes Recorded Over Recent Years

Year	Location	Kilo-amperes	Polarity	Measured by
1935	C.E.B. 132-kV Thames Crossing	30	−	C.E.B.
1938	Y.E.P. 66-kV Thornhill	30	−	E.R.A.
1938	C.E.B. 33-kV Burnley-Accrington	30	−	E.R.A.
1939	C.E.B. 66-kV Roding Crossing	20	−	C.E.B.
1943	C.E.B. 33-kV Lincolnshire Ring, S.E. line	57	−	E.R.A.
1943	C.E.B. 33-kV Lincolnshire Ring, S.D. line	17	−	E.R.A.
1949	B.E.A. 132-kV Thames Crossing	24	−	B.E.A.
		3	+	
1950	B.E.A. Kingston Power Station	8	+	B.E.A.
1951	Skylon ... ... approx.	50	−	B.E.A.
1952	B.E.A. Croydon "B" Power Station	1·5	−	B.E.A.

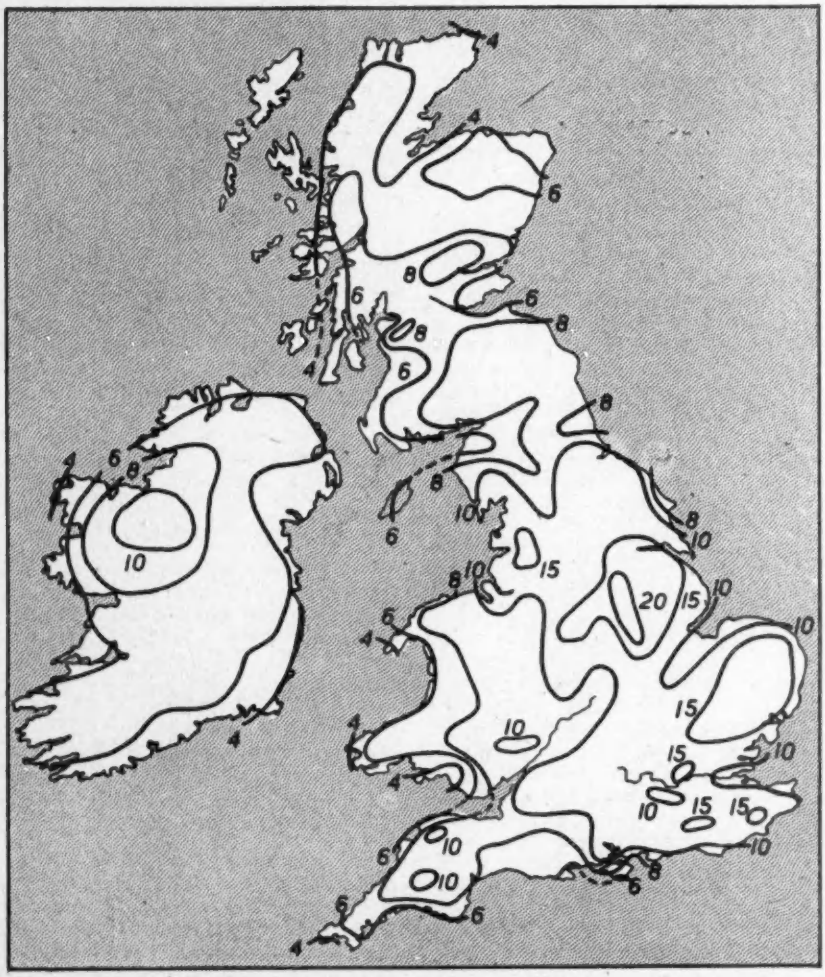


Fig. 1.—Shown here are the Isokeraunic levels for the British Isles. (Reproduced from the British Climatological Atlas by permission of the Controller of H.M. Stationery Office)

somewhat offset, however, by induced surges causing faults on low-voltage lines. At the highest contemplated voltages the line insulation is necessarily so high that the proportion of strokes of sufficient magnitude to cause flashover is approaching zero.

The relatively high fault rates on the 11, 22 and 33 kV systems with a total route mileage of approximately 30,000 miles present a considerable problem and merit special attention. It is the purpose of this article to review the lightning troubles and the methods adopted to minimise them so as to give the highest possible continuity of supply.

Fault rates on lines of a given type of construction vary both with system voltage and also with thunderstorm activity. On the basis of data gathered over some 14 years on the C.E.B. lines, it has been suggested by Forrest[2] that the severity of storms is not directly proportional to the keraunic level but rather is of the form

$$F = kN^s$$

where F is the fault-rate, k a constant, N the number of days/annum on which thunder is heard whilst s, the "severity index," is another constant having a value in the region of 1·9.

Fault rates (faults/100 route miles/year) on the lines run by the C.E.B. in the 14-year period mentioned above were 5·4 on the 11 and 22 kV systems and 3·8 on the 33 kV system.[1] These apply to lines of uniform construction of a type somewhat different from those used on the distribution systems as a whole and for the relatively small length,

TABLE 2.—Route Lengths of Lines in this Country

System voltage...	66 kV	33 kV	22 kV	11 kV	Below 11 kV
Line route length (miles) ...	1,500	4,500	2,200	23,000	3,000

at 11 and 22 kV, of 25 route miles. The figures obtained at these two voltages should therefore be regarded only as some indication (probably on the low side) of rates on distribution lines. For example, on the Y.E.P. Co.'s 11 kV system over a 12-year period there were 7·8 faults/100 route miles/year due to lightning and at 33 kV over a 20 year period the figure was 5·2 faults.[1]

All lines below 132 kV are now operated by the Area Boards and the above lines thus form part of some 30,000 route miles of lines at 33, 22 and 11 kV in this country. The fault rates on these are not known as a whole though individual records of some or all of their systems are kept by most Area Boards.

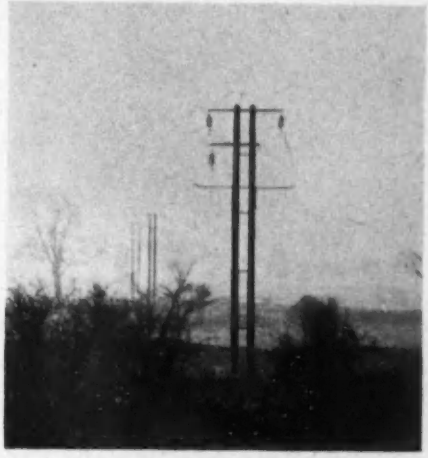


Fig. 3.—A typical 33 kV H-type pole with underrunning earth wire

A comprehensive statistical investigation of this subject is being carried out by the E.R.A. on behalf of the B.E.A. but it will be some years before any valid conclusions can be drawn from this work. This is because the annual variations of thunderstorm activity in a given area are very great and two or three years may pass with very few lightning faults, only to be followed by a period of considerable trouble.

Network Design

The lengths of line of various voltages have been increasing more or less steadily ever since lines were first erected on any scale. It is estimated that the overall length is doubled, approximately, every 15 years. The present route lengths of distribution lines are estimated to be in the region of the values shown in Table 2.

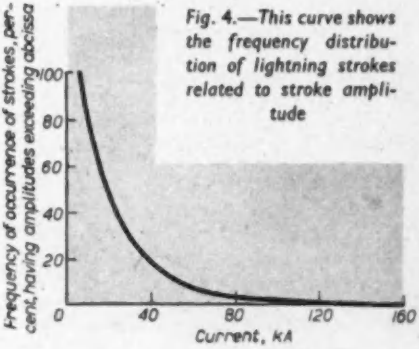


Fig. 4.—This curve shows the frequency distribution of lightning strokes related to stroke amplitude

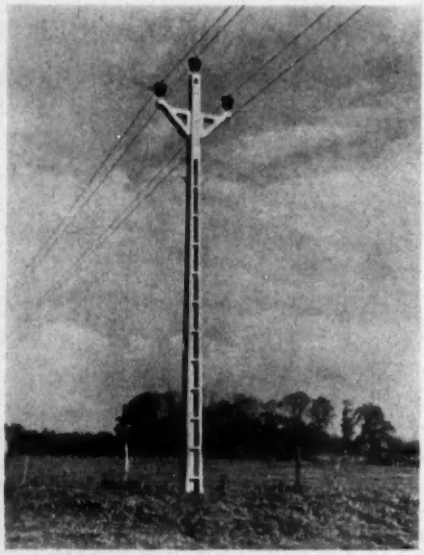


Fig. 5.—Another type of pole construction is shown here—a concrete pole for an 11 kV system with under-running earth wire

The layout of the 33 kV system is in partly radial, partly ring form and double-circuit lines are extensively used. Three-quarters of the total route-length in the case of those lines formerly operated by the C.E.B., and rather less than half that of the remainder, are of this construction.

Petersen-coil earthing of the transformer neutral points is used on some 40% of the system, resistance earthing on most of the remainder. A good deal of cable is used which, when it occurs on the run-in to a substation, often plays a useful role as a type of surge absorber.

The design of the 11 kV system is somewhat different from this, being mainly of radial form with few rings and little double-circuit construction. Most of the system is directly earthed but some 15% is of Petersen-coil earthing. The lines at 22 kV and less than 11 kV have very much the same design characteristics as those of the 11 kV system.

Line Construction

There is a very great variety of types of line construction at the various voltages though wood-pole construction is common to most of them for reasons of economy. It should be mentioned that it is by no means rare to have poles or towers bearing lines of different voltages—33 and 11 kV, 66 and 33 kV, 66 and 11 kV, etc.

On the relatively short length at 11 kV, and 1,000 miles or so at 33 kV, of standard steel-tower construction an over-running earth wire is almost invariably used. On the other steel-tower and wood-pole lines the type of construction varies all the way from earthed, steel crossarms and over-running earth wires, to all-insulated poles with virtually no steel-work anywhere other than at the junction of the crossarms with the pole. In the case of most wood-pole lines other than the all-insulated it is usual to earth all steelwork, crossarms and so forth, at approximately four points in every mile.

A rough indication of the various types of construction in current use is given in Fig. 6. The diagram is not intended to be comprehensive but does include most of the constructions commonly employed. Pin insulators are used very widely on most of these lines though a three-unit string of insulator discs is not uncommon at 33 kV. The relevance of the disposition of the earth wire with respect to the phase conductors is discussed later in this article.

Fuses

Fuses are not extensively used at 33 kV where good discrimination is essential in circuit interruptions caused by faults owing to the relatively large amounts of power, and the number of consumers involved in each interruption. Occasionally it is economically desirable to employ them and they may be installed at substations to protect transformers.

At 11 kV, 22 kV and 6·6 kV and below, however, they are extensively used for economic reasons. The large number of points where protection is required makes the universal adoption of circuit-breakers out of the question.

The disposition and ratings of fuses is to a great extent dictated by the individual circuit requirements. In so far as there is some freedom of choice in the ways and means of meeting the requirements, it appears that opinions differ considerably and there is certainly no common practice. For example, in many cases individual fusing for each 11 kV transformer has been dispensed with and, instead, a fuse is fitted at the spur point where a line leading to two or three transformers is connected to a main ring or feeder.

This practice is based on the following considerations:

(a) If a lightning fault occurs all three transformers would very probably have

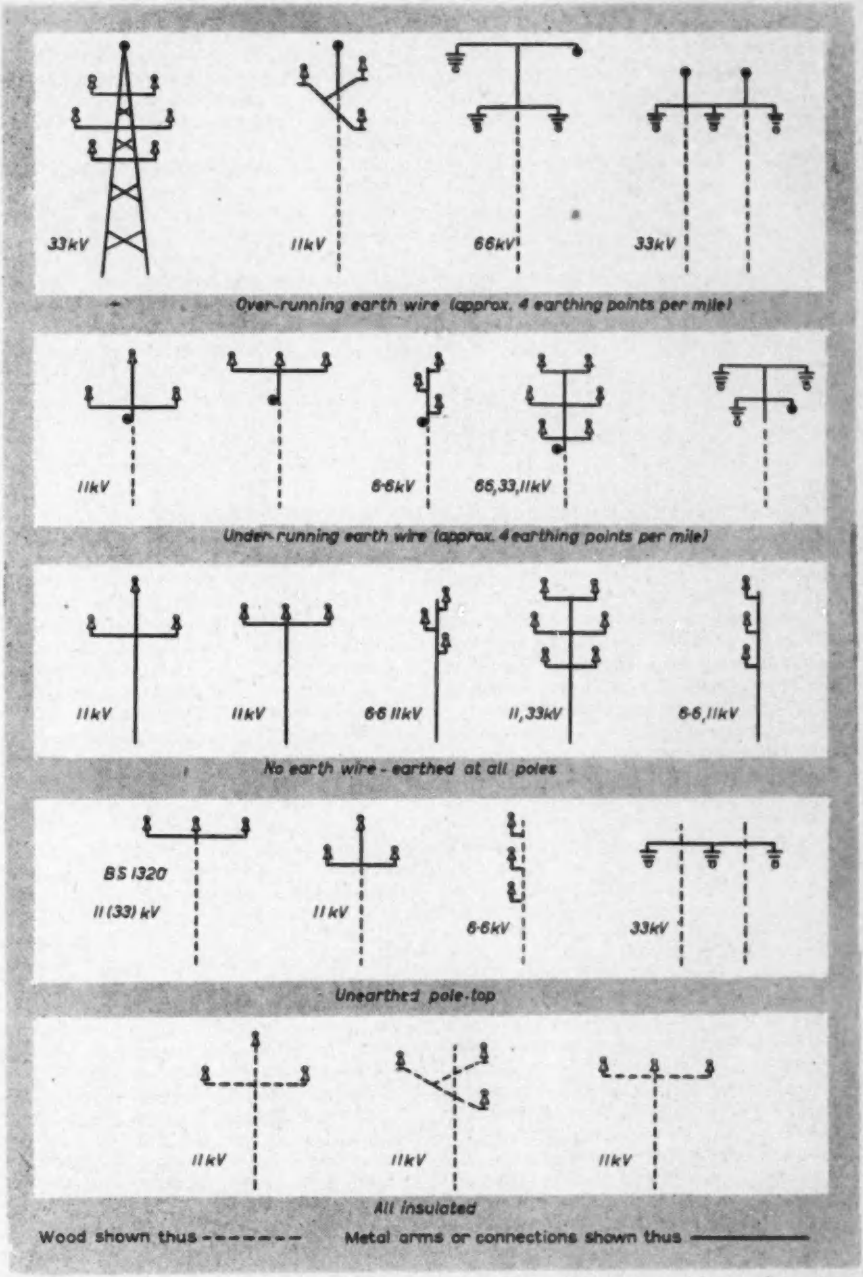


Fig. 6.—This diagram shows a variety of the low and medium voltage poles and line configurations most commonly in use

fuses blown, if individually fused.

(b) Inadequate discrimination often leads to the blowing of the spur fuse as well as the individual one. As a typical example, a 10 ampere fuse might be the maximum permissible at the spur and a 5 ampere the minimum required at the transformer. With such values there is some possibility that both fuses would blow under most earth fault conditions if not on overload.

(c) Even if adequate discrimination is available it may often be desirable purely on grounds of maintenance time and accessibility to restrict the fusing to the spur point. On the average, less consumer-time may be lost although more consumers affected.

On the other hand, quick-acting fuses may be employed on each transformer with the object of preventing damage during surge flashover of the transformer. This should not be necessary if gaps are fitted but it should be effective if the transformer is unprotected since spark-over above oil and even under oil can occasionally occur without damage to windings if follow-current is suppressed.

The case of pole-mounting transformers is a major feature of the lower voltage systems and their protection by means of diverters and other devices is dealt with later in the article. The immediate concern will be with measures adopted to minimise lightning troubles dealing initially with common types of o.h. line in service.

REFERENCES

1. Forrest, J. S. Proc. I.E.E. Vol. 97, Part II No. 57, June, 1950, p. 346.
2. Forrest, J. S. Quart. J. Roy. Met. Soc. Vol. 76 No. 329, July, 1950, p. 285.

(*To be continued*)

Atomic Energy Corporation

ESTABLISHMENT of an Atomic Energy Corporation to control the future development of nuclear power in this country was announced as Government policy in a White Paper issued last week. In essentials the Government has accepted the report of a committee consisting of Lord Waverley, Sir Wallace Akers and Sir John Wood.

The Corporation, it is recommended, should be a statutory Corporation with an executive board. To the Corporation should be transferred responsibility for Ministry of Supply establishments at present controlled by the Atomic Energy Research Establishment, the Production Division, and by the Atomic Weapons Research Establishment. The Board of the Corporation should consist of a chairman and six other members.

The chairman should act as a General Manager (Sir Edwin Plowden has been provisionally appointed to this post), and the Board should include four whole-time functional directors. These would cover, respectively, engineering and production; weapons; research; and administration and finance. There should be two part-time members without a specialised function.

Policy directions to the Corporation should be given by a Minister responsible to Parliament, according to the Committee. (Lord Salisbury has been nominated.) The Minister's duty is defined as "to ensure the well-being and efficiency of the Corporation as a whole and the maintenance of a balance between the use of atomic energy for defence, for power, and to an increasing extent in the biological applications, in conformance with policy laid down from time to time by Ministers collectively." A Ministerial Committee representative of all the Departments concerned with atomic energy should be set up; in addition there will be, as at present, a representative Official Committee.

For finance, the Corporation will for many years be dependent on public money. The recommendation is that this money should be voted annually by Parliament in the form of a grant, unspent money being surrendered at the end of the year. Certain arrangements are suggested for ensuring that the responsible Minister and his accounting officials should not be required to answer for all the detail of the Corporation's financial arrangements. This is of some importance for there is specific recognition that it would "be essential to ensure that the arrangements adopted give the Corporation freedom to conduct its affairs, including the execution of large capital projects, in a business-like way." In this respect Lord Waverley's Committee recommends that the Corporation should be allowed rather more flexibility and discretion in respect of capital expenditure than is usual with Government Departments.

The ultimate intention is that a Bill will be introduced to set up the Atomic Energy Corporation. Meanwhile responsibility for atomic energy is to be transferred to the Lord President of the Council by statutory instrument as from 1st January next year.

Plant for Taaibos

New Escom Station Scheduled for Seven 60 MW Sets

By W. L. SPEIGHT

INCREASING demand for power in the northern Orange Free State and on the Rand, due to the great activity in mining and industry in the past few years and the even greater development expected in the future, has caused the Electricity Supply Commission of South Africa to plan extensive expansion schemes.

In part this increasing demand for electricity has been met by extending some of the established power stations, but that did not meet all the anticipated demand, and as a consequence it was decided to provide two entirely new power stations. One of these is Vierfontein, which is already partly in commission. The second of the two power stations is Taaibos, where the first set should be running by September, 1954. Considering the speed with which the preliminary and subsequent work has been done it seems possible that this aim will be achieved. The second 60 MW set should be working early in 1955 and others will be installed later. Taaibos power station will provide much of the needs of the new goldfields in the Orange Free State and will also be interconnected with the Rand network of the Commission, as with the other stations.

Plant Details

The seven 60 MW sets are being supplied by C. A. Parsons and Co. On the steam side, each turbine is to have two unit evaporators of 12 klb/hr rating, fed by bled steam at 17·2 lb/sq in. abs. and 220° F. Two condensers with a normal back pressure of 1·75 lb/sq in. are associated with each turbine, the rating being 48,000 gallons/minute, with the temperature rise of circulating water through condensers estimated at 13·5° F at 60 MW.

The stator of the alternator will weigh 108 tons and the rotor 35 tons. Each machine will be about 83 ft long, 24 ft wide overall above turbine floor, with 12 ft height above turbine floor. It is the first time that generators so large have been installed in a South African power station, and to carry them up from the coast the South African Railways have had to design and build a special truck.

Work on erecting the boiler units started some time ago. Among the constructional details are superheaters of the pendant multi-loop type with primary and secondary sections and interstage spray type attemperators; economiser of the multi-loop type, in two banks, end to end, and each bank of seven loops in two tiers; and an air heater of cross-flow tubular type; furnace with tangent bare water tubes. Pulverised coal firing is used and multi-cell grit arrestors are provided on the outlet side of air heater. Ash disposal is by the Hydrojet system and dust by the Hydrovac.

Each boiler will burn some 40 tons of coal an hour, and when the power station is in full commission the daily coal consumption will be over 6,700 tons. The station is to be equipped with a large plant to handle the daily residue of 1,400 tons of ash, which is to be discharged into water and quenched. The mixture of water and ash is to be pumped to the settling ground lying at its farthest point over a mile from the power station. One reinforced concrete chimney will receive the furnace gases from each pair of boilers. The chimneys will be 300 ft high, 31 ft internal diameter at base and 19 ft at top, and brick lined for just over half way up. The plant will be controlled automatically, so that fuel supply will come in according to the load demand without special attention from the operating staff.

The boilers are to be made in South Africa and will be twice the size of any yet made in that country. The top boiler drum will be positioned about 110 ft above the datum of basement level.

Alternators

The 60 MW, 11 kV generators are designed for 0·85 power factor lagging. They will be equipped with main and pilot exciters. Ventilation will be by means of two 386 h.p. cooling fans per generator. The generators will be connected solidly to 11/132 kV transformers rated at 70 MVA with air-blast cooling. The average weight of each transformer, 116 tons, makes them the largest three-phase units yet to be installed in South Africa.

Bulk oil 132 kV circuit-breakers of the auto-reclosing pneumatically operated type are to be installed with a rupturing capacity

of 3,500 MVA and a current rating of 600 amps. The outgoing 88 kV lines will be controlled by 1,500 MVA, 400 amps bulk oil auto-closing solenoid operated circuit-breakers.

The station auxiliaries will have 3·3 kV motors in capacities ranging from 200 h.p. to 1,620 h.p., with smaller motors running from a 380 V three-phase supply. The 3·3 kV switchgear will consist of 150 MVA draw-out type circuit-breakers, the current ratings from 200 amps to 2,000 amps, while the 380 V supplies are controlled by fuse switches with contactor starters.

Five 132 kV lines will run from the high-voltage switch yard in a westerly direction, four of these lines serving distribution stations in the western Witwatersrand area and the fifth joining up with the new Vierfontein power station. Two 132 kV lines will run south to the distribution station at Virginia, and two 88 kV lines will join up with the Vaal power station lying to the north. Wayleaves have also been secured to run another two 132 kV lines in a westerly direction, one to a distribution station somewhere in the Orange Free State and the other to the West Wits area. This work will only be done when the development of the transmission system calls for it. The 88 kV lines are to have pilot wire protection backed by over-current and earth leakage relays, and the 132 kV lines are to have carrier current protection which will be backed up by distance relays.

Other work which will have to be done in connection with this new power station is the provision of four raw water reservoirs with a total capacity of 8 million gallons. There will be a coal staith 800 ft long, with a capacity of 24,000 tons, the coal to be fed direct from the colliery on an overland conveyor. Seven cooling towers with the necessary ducts and canals have been built from the turbine condensers to the cooling towers. These towers will be 270 ft high, with the pond level diameter 200 ft and each with a capacity of 3,000,000 gallons per hour. There will also be a water purification plant.

This will probably be the most expensive power station so far constructed in South Africa, as it is estimated that when all seven turbo-generators are in commission nearly £20,000,000 will have been spent. This sum will also include the ancillary equipment, civil works and also the residential township.

Our readers' views . . .

Multi-way Adaptors

I CAN well sympathise with Mr. J. H. Quick (your issue of November 12) in his complaint about multiway adaptors as I have fallen into the same trap myself. In this case, however the "appliance" concerned was a universal television receiver which, incidentally, bore no polarity markings on the back. As the system was 210 volts d.c. I first checked the polarity of the socket-outlet (2-pin, 15-amp) and by trial and error (involving the blowing of the set fuses) the correct polarity of the set. In order to run a radio from the same point, an adaptor—15 amp to 15 amp plus two 5 amp outlets were purchased and under the false assumption that the polarity of the outlets, looking on them, would be the same way round as the original socket outlet the sets were duly plugged in to the 15 amp sockets and in both cases the fuses blew.

This was particularly annoying as it happened on a Sunday

J. R. Brown

RICHMOND

Amateur Wirin

MANY readers will side with Mr. D. H. Stewart in his support of efforts to eliminate the amateur wiring enthusiast, but I doubt if legislation could ever be produced which would effectively prevent some of the appalling examples of wiring which can be found in private premises. Further while appliances are sold without the necessary plugs, the onus falls on the purchaser to buy this vital item and to connect it to the flex.

But from connecting plugs, the amateur usually begins to graduate by stages into fixing extensions and there the danger begins.

I therefore feel that as the situation is—again in private houses—virtually uncontrollable, any information which will prevent the amateur falling into the pitfalls of overloaded wiring, unearthed appliances in the kitchen and overfused circuits is more to be applauded than condemned.

C. Oppenheimer

LONDON, W.C.1

FIGHTING CORROSION

Cathodic Protection for Buried Metal is a Technique with an Extending Range of Applications

IN 1824, Sir Humphry Davy described to the Royal Society his work on the corrosion of the copper sheathing of ships. In that paper nearly 130 years ago he established the idea of corrosion as an electro-chemical phenomenon, and described how copper, for example, could be galvanically protected by the attachment of blocks of a "baser" metal such as zinc or iron. Yet although the principles of the technique have been known for so long, it is only in the last three decades that it has been widely developed for the protection of iron and steel structures ashore.

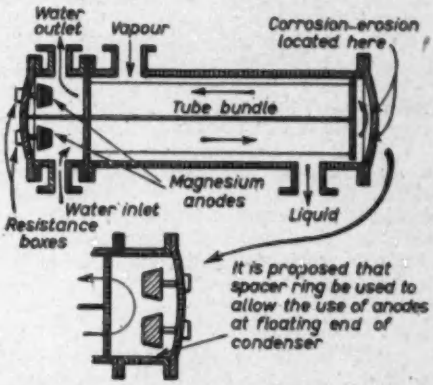
To discuss the present position of cathodic protection, as the technique is called, the Corrosion Group of the Society of Chemical Industry organised a symposium last Friday. In the papers then presented the importance of cathodic protection to the electrical engineer both as an outlet for his products and a safeguard for his installations was explored in considerable detail.

General Principles

General principles of cathodic protection were described by Mr. K. A. Spencer. The basic idea, of course, is to keep the protected metal electro-negative to a contacting electrolyte at the boundary inter-surface. An alternative is to prevent the electrolyte from reaching the metal, but no perfect coating seems to exist. In general, the economic solution is a combination of a good coating with the application of cathodic protection.

The choice lies between sacrificial anodes, in which a block of magnesium, for example, is connected to the steel, and gradually corrodes away; and the power-impressed installation, in which an electrical potential from an external source is used to keep the steel electro-negative. Whichever method is used, it is necessary to make the steel (or iron) structure more negative than 0·85 V to the contacting electrolyte referred to a copper/copper sulphate electrode, in order to obtain cathodic protection. When sulphate reducing bacteria are present in the soil, as is common in the U.K., the potential must be raised to at least 0·95 V.

Magnesium anodes may be used for isolated structures, but only where the soil resistivity is less than 2,500 ohm/cm³ (or 1,500 ohm/cm³ for 0·95 V). More generally a direct current supply is obtained from transformer-fed metal rectifiers, and is fed into the soil by graphite anodes. Protection may prove difficult if the quantity of electrolyte is limited, while with aluminium the use of



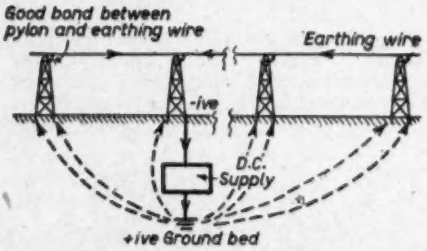
Proposed method of applying cathodic protection at both ends of a condenser

cathodic protection may have the effect of building up alkalinity at the metal surface, with resultant chemical attack. In making this statement, Mr. Spencer specifically had in mind aluminium sheathed power cables.

Besides pipes and marine structures, which will be discussed later, condensers and transmission towers can be usefully protected by cathodic methods. Tubular condensers using non-ferrous tube-bundles and cast iron or steel shells may suffer heavy corrosion at end plates and dividing partitions. This has been successfully counteracted by using magnesium anodes placed at the water inlet and connected to the shell through a resistance. Unfortunately, the protection does not extend more than 2½ diameters along the tubes themselves, and some non-ferrous tube manufacturers claim that the corrosion product from the magnesium settles inside the tubes and produces local corrosion. Mr.

Spencer admits the feasibility of this, but states that he has heard of no practical evidence of its occurring.

So far as transmission towers are concerned, it is their footings that can be protected. The earth wire running between towers may be used to give the necessary continuity, but special bonding to the towers to reduce resistance may be necessary. In Persia, magnesium anodes connected to every tenth



When overhead line towers are protected, a good tower to earth wire bond is needed

tower were used, but rule of thumb methods cannot be relied upon. For underground cables, cathodic protection is likely to be advisable when steel armouring is employed, but its success is less certain with unprotected lead sheaths.

U.S. Experience

United States experience with cathodic protection was described by Messrs. D. H. Lewis and O. C. Mudd (Shell Pipeline Corpn., Houston, Texas). Their company operates some 6,100 miles of buried pipelines, and leaks due to corrosion may prove extremely expensive. Work on cathodic protection began in 1935, and has steadily extended since then. Early experiments were based on zinc anodes, wind-powered d.c. generators, and copper oxide rectifiers. Eventually a technique was evolved of combining good coatings with cathodic protection.

Where distributed a.c. is available, d.c. is now obtained either from rectifiers, m.g. sets or rotary converters. Metal rectifiers are preferred. For isolated sites, the choice is limited to internal combustion engines or wind power. The best-known operating record for a number of engines maintained on a practical schedule did not exceed 80%, and most engines have now been withdrawn from service. Maintenance every three or six months is sufficient for wind-driven generators, but the occurrence of occasional periods of calm makes this source of d.c. undesirable.

For electrodes, carbon or graphite anodes are normally used. Carbon anodes suffer the disadvantage of rapid deterioration when chlorine gas is liberated in conjunction with current flow. Coke breeze added round the anodes helps to decrease soil contact resistance and thus keep down power cost. A minimum of 1·5 anode-diameters thickness of breeze should be tamped down into place all round the anode.

All in all, the Shell Pipeline Corporation conservatively estimates at 2½ million dollars its net savings as a result of 15 years of corrosion mitigation work.

Middle East

In the oil producing countries of the Middle East, such as Iraq, Saudi Arabia, and Kuwait, soils are generally very corrosive. The first applications of cathodic protection were made in connection with submarine pipelines off Bahrein Island. Since then there has been a wide extension of the technique. This was described by Mr. W. C. R. Whalley (Iraq Petroleum Co.). He gave the previously quoted 0·85 volt protective level relative to a copper/copper-sulphate electrode as equivalent usually to a charge of 0·3 volts at the surface of the protected iron.

Where an a.c. supply is available the metal rectifier is the first choice for power supplies, a totally enclosed oil-filled type being usually selected for duty in the Middle East. Continuous adjustment of current by hand wheel is a useful feature as are built-in ammeters, voltmeter and thermometer. In certain isolated installations rectifiers have been equipped with a built-in constant current device using a transductor circuit. This avoids overloading the rectifier when heavy rain causes a considerable (50%) reduction in circuit resistance.

In exceptional cases, the erection of a long a.c. supply line to feed rectifiers may be justified. For the Iraq pipeline a rural type supply line working at 11 kV has been adopted to feed the large number of rectifiers employed over 500 miles of right-of-way from Kirkup to Banias.

Elsewhere diesel-engined generator sets have to be considered. In Middle East conditions, isolated generator sets may be preferrable to line-fed rectifiers when the spacing between installations exceeds 10 miles. Shut down time for generators for maintenance and involuntary outage is found to be about 7% of total time. Slow speed diesels are used, and are derated for this isolated service, and provided with an oversized lubricating

oil sump. Normally they are visited by a patrol once a week, but in wet weather they may be unapproachable for two or three weeks at a time.

Generators associated with these isolated diesels may be arranged to have a constant current characteristic similar to the rectifiers mentioned previously. A minimum ballast load may be installed against the possibility that the external current requirement is less than one-third of the normal load.

Belgium

Belgian activities in the application of cathodic protection were described by Mr. A. Weiler. Here the problem of corrosion became prominent with the laying of a network of high pressure gas mains consisting of welded steel tubes. Stray currents from electric tramways and railways complicated the problem, and many law suits resulted. Now the tramway current provides protection for the pipeline.

In 1933, experiments were made in bonding the pipe-lines to the return circuit of the tramway system It was found that the pipelines were bringing 70% of the current back to one substation, with protection for the pipeline and reduced return-circuit loss for the tramway company.

In general, direct connection of the pipelines to the rails has been found to be undesirable, due to the risk of current reversal in some circumstances. Instead a relay-controlled contactor is inserted in the connection circuit, which opens when the current flow reverses, and closes as soon as the return rail has a positive potential of about one volt with respect to the pipe-line. In certain cases, a variable resistance (such as a battery of carbon lamps) is inserted to keep down the strength of the current flow.

Of course, such schemes can only be used when pipe-lines are reasonably close to railways. Nevertheless, they are now very widespread in Belgium, and their success has led to the application of more general schemes of cathodic protection. Cathodic protection is also being applied to the lead sheathing of old cables, that have already corroded. In its early stages of application, it may accelerate failures which would have occurred later, but it will be effective in preventing further corrosion.

Naval interest in cathodic protection was mentioned at the beginning of this article. Today, this interest extends not only to ships but also to shore establishments, as Mr. J. T. Crennell (Royal Naval Scientific Service) made clear in his contribution to this symposium of valuable papers.

At present the Royal Navy does not apply cathodic protection to active ships, partly on account of the need to keep weight to a minimum. Reserve Fleet ships laid up, however, are usually given cathodic protection. When impressed current techniques are used an allowance of between 1 and 2 amp per 1,000 feet of wetted area is made.

Experiments have been made on the cathodic protection of aluminium, and considerable success has been achieved. This has involved protection by impressed current methods when some such metal as copper is present. Such a metal usually has the effect of causing aluminium to corrode rapidly. Corrosion has been adequately arrested even with such unpromising combinations as aluminium alloy propellers attached to stainless steel shafts.

Equipment in Mines and Quarries

FURTHER regulations have been drafted by the Ministry of Fuel and Power as part of the drive to introduce up-to-date requirements for electrical cables used in mining. This time it is metalliferous mines and quarries which are affected. Safety Circular No. 207 issued by the Ministry announces the intention of revoking two statutory instruments which permit the use of certain cables which were lawful before 1938.

The two Statutory Instruments concerned are the Quarries General Regulations (Electricity) (Exemption) Order 1947 and the Metalliferous Mines General Regulations (Exemption) Order 1947. It has for some time been intended that a date should be fixed when all cables and other electrical apparatus would have to comply with the requirements of the General Regulations of 1938. In two draft Orders, this date is now fixed as September 1, 1955.

In this respect, it has to be noted that the Minister of Fuel and Power has authority to grant exemptions for individual mines or quarries under the 1938 Regulations, and that he may exercise these if particular cases of difficulty still exist in two years time.

The draft regulations (see page 970) may be obtained from H.M. Stationery Office. Any objection to them must be sent to the Minister of Fuel and Power not later than December 14, 1953.

NOTES ON WIRING by Megohm

How Not To Do It

HOW easily a sound electrical installation can be made a defective one by incompetent people carrying out extensions is clearly illustrated in a report given to me a little while ago on defective work.

The report stated that since the time (a few months ago) that this particular installation was inspected and tested and found to be in a most satisfactory condition, a builder's handyman-electrician had installed a 13 amp switch socket outlet in the dining room so that an electric toaster could be used. The housewife observed and was concerned that sparking occurred by the earth pin on the toaster even when the switch on the socket outlet was in the 'off' position.

An electrical contractor was called in to inspect the addition to the installation and on inspection of the work carried out for the extension socket outlet it was observed: (i) that the wiring comprised 2-core 3/·029 v.r.i. lead covered cable and was run back to a control unit and connected to one of the 30-amp fuses for a ring circuit supplying other 13 amp switch socket outlets; (ii) that entry into the control unit was effected by prising and bending up a corner of one of the cover plates on the metal trunking fitted above the control unit; (iii) that the toaster element was making intermittent contact with the metal framework of the toaster.

It is clear from the foregoing the builder's handyman-electrician did not understand the danger and risk he was introducing into this household when he installed this extension.

Seven Faults

It is interesting and instructive to consider the number of faults made in carrying out this extension. These are as follows:—

(1) Two-core 3/·029 v.r.i. lead covered cables should not be connected to a ring circuit. The minimum cross section for v.r.i. conductors permitted to be connected to a ring circuit is 7/·029 and where mineral insulated copper sheathed cables are used they should not be less than ·003 cross section.

(2) The rating of 3/·029 v.r.i. cables is 10 amperes and therefore connecting such cable to a 30 amp fuse was wrong since no protection is provided against overloading.

(3) Connecting a 13 amp switch socket to 3/·029 v.r.i. cable which in turn is connected to a 30 amp fuse creates a condition that permits a 2/3 kW piece of electrical apparatus to be plugged into the 13 amp socket. The current passing exceeds the current rating of the cable and will overheat the conductor and cause speedy deterioration of the insulation.

(4) The lead sheath of the cable entering the control unit under the cover plate of the trunking, of course, is not properly earthed. The cable here should have been made off with a properly constructed factory made cable-to-conduit gland.

(5) The potential on the toaster with the socket switch in the 'off' position indicates that the switch was not connected in the phase conductor and the toaster element, of course, was alive when the switch was in the 'on' or 'off' position.

(6) Sparking between the earth pin on the toaster due to the element coming into intermittent contact with the metal frame of the toaster obviously would continue because:— (a) the current flowing was limited by part of the resistance of the element in this case being in circuit, and (b) the limited current flowing in any case could not blow a 30 amp fuse and clear the circuit.

(7) Since the case of the toaster was alive the possibility of a severe shock to any person handling the toaster.

Seven faults on such a small extension are surely enough to emphasise the importance of establishing legislation to prevent unsuspecting people being subjected to such unnecessary hazards by allowing any Tom, Dick or Harry to carry out work for which they are not properly trained. The householder is naturally concerned to be advised the costs that will be involved in putting right such defective work.

It occurs to me that some of our readers may care to make suggestions of a good and economical way to correct this bad work bearing in mind that the length of 2-core 3/·029 v.r.i. cable run and concealed in plaster work is approximately 20 yards and cannot be disturbed, and that it is not convenient to break into the existing ring circuit.

Dimming Fluorescent Circuits

I.E.S. paper discusses use of miniature units for industrial processes

MUCH of the paper "Applications of Fluorescent Dimming Circuits" presented last week to the Illuminating Engineering Society, was concerned with stage lighting where dimmers for fluorescent lighting would be expected to find most use. For this use the full-range, 100-step resistance bank dimmer is most commonly employed, but the authors, Dr. H. H. Ballin and Mr. W. J. Vine, explored other fields of application in which recently developed miniature dimmers have given satisfactory service.

Designed primarily for certain industrial processes, the 5-step miniature dimmer provides variation over a more limited range than the 100-step unit. On the other hand its compactness and comparative cheapness hold distinct advantages where space and cost considerations predominate. Intermediately, the 20-step miniature dimmer switch provides greater control over light output—of value in commercial applications where lighting may require adjustment with daylight variations.

In the field of colour changing, particularly that where artificial lighting should match daylight during the day time but incorporating a greater degree of warmth at night, standard 100-step dimmers can prove to be too expensive. Here the development of a circuit in which three 80 W tubes are controlled from a single choke and rheostatic divider has proved useful. By this method illumination is provided by any one of the three, or by two contributing a proportion each so that the total output remains approximately constant. A variant of this system provides for control of two lamps, the third being operated with conventional gear.

Uses for miniature types

Applications of miniature dimmers to industrial processes include that of inspection lighting where background brightness is determined by the product being viewed. Cloth manufacture and photographic film coating are two such examples. One requires high background illumination, variable to suit different types of cloth; the other demands low brightness whose level can be adjusted to suit film speed, whilst its colour components must be altered for different emulsions.

For these applications the 5-step dimmer is usually satisfactory. The 20-step unit, with its more even graduation, is likely to prove advantageous in traffic or movement supervision in darkness, where control is effected from a lighted structure. Scientific research, of which the use of adjustable fluorescent lighting for investigating plant or algae growth is a typical example, is a further application for means of easy adjustment of lighting levels.

Auditorium lighting in theatres, cinemas or concert halls must provide for smooth control in the transition from high illumination levels required for meetings, or movement of people, to the darkness of a performance, if discomfort is to be avoided. As some tariffs tend to discriminate against a high loading, the re-lighting of many auditoriums in which the lower efficiency tungsten lighting is at present used becomes both economically and aesthetically advantageous. Community centres in new towns, serving a variety of purposes, require not only level control but colour variation to meet the demands of lectures on the one hand and social gatherings on the other.

Flood Lighting

Fluorescent lighting may also in certain circumstances be applied to exterior flood lighting and, combined with colour changing, can draw attention to buildings partly hidden by intervening foliage. There is much scope for dimming in the allied field of outdoor "illuminations," notably in colour changing systems for trees and natural scenes. Although the speed of colour changing is largely a matter of opinion, and local circumstances, a variable speed motor holds advantages in this sphere. Moreover, by separate control of rear and front lighting, motor asynchronism adds undeniable variety.

In the field of display lighting, dimming circuits are expected to find many uses once operation is made simple and inexpensive. Window lighting provides possibilities for exploiting dimming circuits by virtue of the variety of displays likely to be employed. Here the three-tube divider can offer a means of changing the colour content of light to suit different kinds of merchandise. Additional interest in the display is provided by a colour changing background.

E.I.B.A. BALL

ONE thousand and sixty-six—1066—guests at the Electrical Industries Benevolent Association annual ball last Friday cheerfully accepted their chairman's invitation to make so appropriately numbered an occasion an historic one. They succeeded in exceeding by £60 the previous record for the evening, and all in all the Association has benefited by £1,470 from this pleasant social occasion.

Chairman for the evening was the Association's President, Sir John Dalton, who with Lady Dalton received the guests. During the evening, entertainment was provided by a mixed, spectacular cabaret, while forty prizes were given away to holders of lucky programmes.

(1) General view of the dance floor which was well filled throughout the evening. (2) Some of the guests inspect the prizes they may win. (3) Messrs. Neville, Clarkson, Margrett, Vinecombe and Gellatly with their ladies. (4) Standing: Messrs. Gallon, Castling, Wells and Gibbs. Seated: Mrs. Castling, Mr. Wilkinson, Mrs. Gallon, Mr. Wood, Mrs. Wilkinson, Mrs. Gibbs and Mrs. Wells. (5) Mr. Jones (E.L.M.A.) being received by the President, Sir John Dalton and Lady Dalton

(6) Mr. F. J. Lane (B.E.A.) in conversation with Mr. Ginger (L.T.E.). (7) Mr. L. Hawles (S. Wales E.B.) makes a point; Mr. E. S. Jones (Ministry of Supply) in the foreground. (8) Messrs. Betts, Brown, Olley, Train. (9) Lt.-Col. Powditch and Mr. Poole, with their ladies. (10) An A.S.E.E. group: Messrs. Thorogood, Parker, Flood and Brooks, with their ladies. (11) Mr. Peacop (Walsall Conduits) chats with Mr. and Mrs. A. Young. (12) A feature of the evening was conjuring at the tables. Here Col Ling Soo is seen entertaining Messrs. White, Major, Davies, Jervis and Brown, with their ladies. (13) Mr. and Mrs. H. Parsons (Enfield Cables) talk with Mr. and Mrs. E. L. Gethin (B.E.A.)

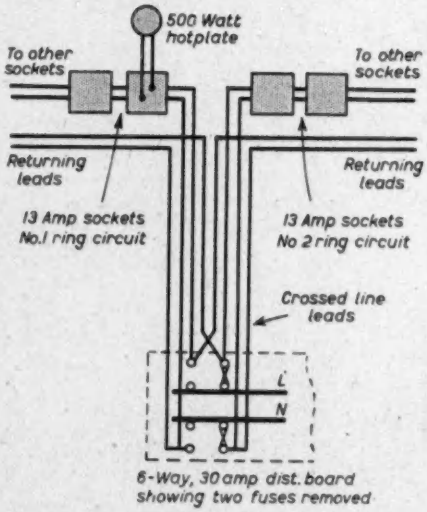
PROBLEMS AND PRACTICE in Engineering

Crossed Ring Mains

MOST readers will have had experience at some time of "Cross Fusing" on t.p. and d.p. fuseboards. This can, however, be quite a serious affair on ring main circuits supplying the 13 ampere socket-outlet system now in use.

In the factory with which I am connected there are two laboratories, supplied from a six-way 30 amp. d.p. fuseboard. Each laboratory has three ring main circuits supplying hotplates, incubators and mixers common to laboratory work. On one of these trouble developed with the plug overheating, and as the load was only about three amps a loose connection was suspected.

The circuit was made dead according to the fuseboard tally, and also line to neutral tried with a lamp before the socket was dismantled. Believing the supply to be off, the electrician doing the job took the socket from the wall, cleaned it and whilst replacing it in the wall box his hand made contact with neutral and earth and he received what he called "full juice."



This circuit diagram shows crossed ring main connections

Checking with a voltmeter we found that both line and neutral wires were alive at mains voltage. After some disconnecting and tracing out it was found that the line lead from the far end of the ring on its return to the fuseboard was connected to the line side of a ring in the next door laboratory, which in turn had a line lead in the circuit we were working on. A glance at the diagram showing the small hotplate in circuit shows how the neutral came to be alive.—*A.M.I.Plant.E.*

Impatient Skip

THE skip feeding the lime-kiln was semi-automatic in so far that when the attendant had tipped in his bogie of stones or coke he pressed the "up" button and the 10 h.p. s.c. motor wound the skip to the top where it emptied itself and returned to its pit ready for the next load. Everything was going fine until the kiln foreman reported that as soon as the skip reached the top it immediately reversed and brought back its load again.

The motor was controlled by a reversing contactor. A limit switch in the pit tripped the contactor on the "down" side while a two-way limit switch on top tripped the "up" contactor and then switched in a magnetic time delay unit which held off the "down" contactor for approximately 15 secs. to allow the bin to empty itself.

The fault was attributed to insulation failure but the "Megger" insulation test was good. The contacts were next examined but nothing amiss was found. The time delay unit was operated by hand but nothing showed up. Finally the skip was operated under power and it worked perfectly. As the foreman was getting impatient it was decided to let the kiln work away while the electrician stood by, but all went well.

Three days later the foreman was back again to report the same trouble. This time the time delay unit was closely examined and the trouble located. The moving magnet yoke, from constant use, mated so perfectly with the magnet face that when the magnet was switched off it held on in spite of the return spring, thereby keeping the down contactor on the "ready." A brass pin in each face cured the trouble.—*C. Byrne.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Problems of a practical nature to which a solution is required will also be considered. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

Electro-Medical Safety

DESIGN DETAILS OF ELECTRONIC EQUIPMENT

ELECTRONIC apparatus is being used by physicians and surgeons to an increasing extent in diagnosis, treatment and operative techniques. For hospital electrical engineers and physicists this trend introduces many new problems. Some of them were discussed at an Extra Meeting of the I.E.E. last week when Messrs. H. W. Swann and H. W. Shipton introduced the subject.

Mr. Swann, comparing practices in hospitals and industry, gave it as his experience that in many cases hospital equipment is used until it becomes defective, and that this condition becomes apparent only in use. It would be far preferable for routine tests to be introduced capable of finding faults before the apparatus is used. There is a need for the hospital engineer to be appropriately qualified and to have proper facilities for the examination and testing of electronic equipment. Something similar to the radio serviceman's kit should be available.

In the operating theatre, there is a serious risk of explosions resulting from the presence of inflammable anaesthetics. There may be possibilities here in using the technique of pressurisation to prevent the ingress of explosive gases into electrical equipment.

Tests and Codes

Mr. Shipton spoke as a user and designer of medical electronic equipment. He divided the apparatus concerned into two types. In one, potentials developed by the patient are recorded or measured (e.g. electro-cardiography) while in the other current is applied therapeutically to the patient (e.g., diathermy and electro-convulsive therapy). For the first type the risk of shock is very small, since connections are made only through input grids. In the second category, there are risks of incendive sparking and of accidental shock.

Mr. Shipton thought that it was difficult to draw up a test schedule for electronic apparatus, which would guarantee that it would operate satisfactorily for a given time after the test. He suggested that routine testing should be confined to plugs, sockets, leads, etc. Finally, he suggested that the time was not ripe for the introduction of a new or rigid code of practice: new devices were being introduced too rapidly for that.

In the discussion that followed, this question of a code of practice was taken up by several speakers. One manufacturer called for a code to protect reputable firms in an extremely competitive market. Less scrupulous concerns cut costs by using unsuitable or war surplus components. At present the normal technique was to use radio-type equipment with special attention to components. Another speaker noted that the Ministry of Health electrical engineers were trying to draw up a suitable code to help manufacturers; a second manufacturer supported the first in his plea for official guidance on what was required. Mr. Swann, in replying to the discussion, found himself in agreement with Mr. Shipton. He did not feel that anything as precise as a code of practice was desirable at the present time.

Equipment Design

There were some interesting recommendations by speakers on construction and installation of equipment. One suggested the use of transistors instead of valves to give greater safety in equipment. Another took the point that the question of earthing of patient's and indifferent electrodes was not given enough thought. There were advantages in surgical diathermy equipment in connecting the patient's electrode solidly to the casing of the equipment. Capacitive coupling through the h.t. transformer to the mains earth then guarded against excessive voltage rises.

American practice, according to one contributor to the discussion, was to include 5 mA fuses in the leads to patient's electrodes. He queried if this really gave any protection against shock. Someone else thought the danger of fire was the main safety consideration, and this led to some consideration of built-in thermal protection switches. With X-ray machines more accessible placing of fuses was suggested. There was also comment on the leads to electrodes. It was suggested that these might with advantage be constructed with braided copper conductors to reduce the risk of progressive fracture of strands.

On the subject of hospital electrical installations in general, two points were made. They covered the need for more attention to earth continuity and in wiring socket-outlets.

Atmospheric Pollution

L.C.C. Recommendations to avoid further "Smog"

THE experience of the great fog of December 1952 has justifiably made the London public somewhat apprehensive of the forthcoming winter. It may be recalled that the fog has been stated to have been responsible for 4,000 deaths between its beginning on December 5 and December 20 (it lifted on December 9), and for some 8,000 subsequent deaths due to consequent pulmonary and respiratory troubles.

Although a Committee—the Beaver Committee—has been established to investigate the problem of smoke pollution, it has not yet produced a report. Evidence is, however, being accumulated, and public interest stimulated both by exhibitions and by the presentation of papers.

L.C.C. Recommendations

One of the bodies most affected is, of course, the London County Council. In the Council meeting last Tuesday the Rivers and Drainage Committee put forward recommendations of evidence which, it was suggested, should be submitted to the Beaver Committee. These recommendations include a request that H.M. Government should do everything possible to ensure ample supplies of smokeless fuel at a competitive price. It is also suggested that more extensive cleaning of coal should be carried out at the pits. Consideration should be given to the question of prescribing a minimum degree of efficiency of grit arresters, a statutory requirement for the maximum amount of grit per cubic foot of flue gas admitted, and an investigation made into the practicability of prescribing a standard of measurement of smoke. A full investigation was required to be made into the effect of high chimneys on dispersal of sulphur compounds and on the concentration of sulphur oxides in the vicinity of large power stations. Testing of the flue gas washing plant developed by the Fuel Research station should be carried out on a full scale, and the question of flue gas washing as an obligatory requirement at all electricity generation stations in populous areas investigated. It is thought that further railway electrification should be considered.

Amending legislation is requested to provide for the approval of the administering authority before industrial boiler plant is modified or installed; power to make by-laws in respect of the arrangements for heating and cooking in new buildings (other than private dwelling houses); to enable the administering authorities to require smokeless fuel to be burnt in open grates used for space heating; compulsory incorporation of grit arresters in all boiler plant consuming large quantities of coal; sampling of flue gases by officers of the administering authority and the establishment of smokeless zones.

It is pointed out in the evidence to be submitted that about half of the smoke pollution came from domestic dwellings using bituminous fuels. The improvement in grate and stove design had probably been nullified by the increasing use of inferior coal. Palliatives suggested are the burning of smokeless solid fuel, and the wider use of electricity or gas for cooking and water heating. It is, however, emphasised that the use of smokeless solid fuel will not result in any material reduction of the sulphur compounds.

Fog Investigations

A paper by Dr. E. T. Wilkins, presented to the Royal Sanitary Institute last week, estimated that although only 18% of coal was consumed in domestic premises, at least 40% and in winter 60% of the smoke in the atmosphere was due to domestic users. In London there was in addition a large emission of carbon monoxide.

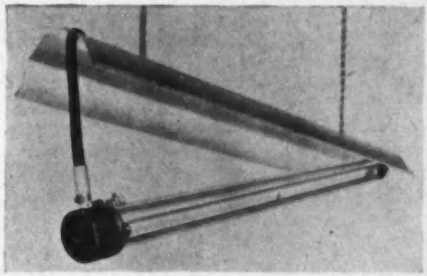
As far as sulphur dioxide was concerned, emission took place with the waste gases from coal, coke and fuel oils. Power stations generally emitted their waste gases at heights of over 300 ft. It was not known how often the depth of the fog bank was less than this, but some evidence showed that this was so part of the time.

The generally sticky or tarry nature of the fog aroused much comment, and Mr. Wilkins suggested that this was due to the new type of open fire which would stay alight all night, but which, during that period, put out smoke and distillation products at a time when fog formation was most likely.

He again suggested the use of "smokeless" fuels, and thought that methods of banking-up coal fires at night might be perfected.

Safety from Explosion

PRESSURISED FITTINGS USED FOR LIGHTING AND CONTROL GEAR



IN situations where hydrogen, acetylene and some other gases may be concentrated, electrical equipment of the usual flameproof type cannot be used. With these so-called Group IV gases, the maximum safety gap is too small to be practicable for most kinds of apparatus, and if electrical gear must be used the choice normally lies between pressurisation and the use of intrinsically safe circuits, i.e., those in which incendiary spark cannot be generated.

In a new system introduced by the General Electric Co., advantage is taken of both possibilities. Pressurisation at 3½ lb/sq in. is used to prevent the ingress of explosive gases, and air leaks are guarded against by pressure-sensitive switches whose contacts are connected in series with a relay to form an intrinsically safe interlock circuit.

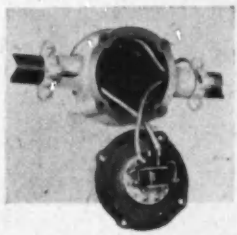
Compactness and Sensitivity

This type of system has of course been used before. The special features of the present design are compactness and sensitivity. Micro-switches are used, often with one in each fitting in the case of a lighting installation. These switches are connected in series, as stated above, and the circuit is completed by the secondary of a step-down transformer, a relay coil, and the resistor necessary to render the circuit intrinsically safe. The whole assembly is itself housed in a pressurised box.

The power circuit is also supplied from this box, a suitable contactor being provided which can be closed and opened by push-button control provided the air-pressure switch circuit is complete. If the control box is itself in the Group IV area, a master circuit-breaker outside the area is necessary, responsive to a pressure-sensitive switch which is connected with the pressurised system.

Naturally, although the system is simple enough in principle, there are a number of practical points that need attention. For instance, provision has to be made for any condensation in the air system. To this end, small needle valves are placed at convenient points for drainage; they may, in addition, be used to provide a slight permanent bleed. Similar considerations rule against the suspension of lighting fittings from vertical runs of conduit. It is far preferable to have the fittings fastened to connecting boxes of a horizontal conduit. Needle valves can conveniently be placed at the ends of the horizontal run and in addition this arrangement is far stronger than the alternative.

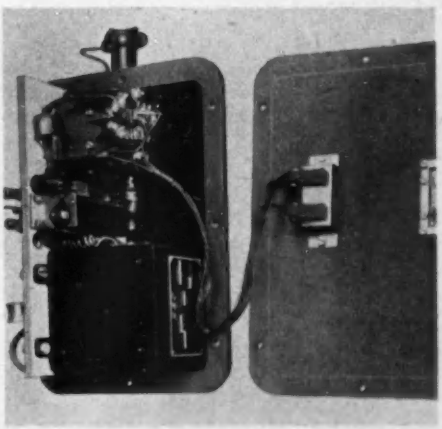
At convenient places in the system it is necessary to incorporate non-return valves in the air supply to avoid any possibility of the



Above is seen a pressurised fluorescent fitting

Left, the pressure responsive switch

Below, a typical control box



dangerous gases percolating back in the event of the fracture of a fitting and the failure of the air supply. A simple flame trap for the same purpose is being developed.

Portable lighting can be arranged particularly effectively. A three-section neoprene hose is used, feeding a lamp which has a neoprene body gripping a glass cover, which is finally secured by a clamp. The pressure-sensitive switch is moulded in with the lamp body. Sectioning of the hose by longitudinal ribs provides separate channels for control and power cables, which of course operate at different voltages.

Extensions in the Channel Isles

Guernsey's Power Demand Shows Rapid Increase

SINCE the liberation of Guernsey from the German occupation there has been a sharp increase in the demand for electricity. Consumers connected for example have risen from 6,000 in 1946 to 10,680 in August 1953, and in the same period the units generated per year have risen from 7·775 million to 28·833 million. This increase has necessitated a major programme of extension and reinforcement of the Island's generation plant and distributing system.

As an interim measure, pending the delivery and installation of the new plant and equipment, a ban was placed on import of heavy current consuming appliances from December 9th, 1947, until August 3rd, 1949. This was sufficiently effective to allow the Island to claim that it is one of the extremely few Undertakings in the British Isles which went through the post-war years without supply cuts.

Plant Installed

The power station known as "St. Sampson's," has an installed plant consisting entirely of diesel-alternators to a total capacity of 10,870 kW. The latest extension, which was commissioned last week, is an English Electric 8 S.R.L. (P.C.) diesel set, and the formal opening was carried out by His Excellency, the Lieutenant Governor of Guernsey, Air Marshal Sir Thomas Elmhirst, K.B.E., C.B., A.F.C., together with Sir Ambrose Sherwill, the Bailiff of Guernsey and some fifty guests, including Messrs. G. H. Mann and W. R. Greves (G.E.C.), Mr. C. R. Dawson of the Diesel Engine Division of the English Electric Co. and Messrs. A. V. Burnett and B. V. Langfield of W. T. Henley's Telegraph Works Co., Ltd. The extension to the main engine room, was begun in 1950, and was to be capable of accommodating three 1,000 kW sets. Two such sets are now in commission.

In order to maintain adequate reserves of fuel to supply the new plant the oil storage capacity has been increased by 240,000 gallons since 1946, and a new 6 in. dia pipe line from the harbour to the storage tanks has also been installed. At present this consumption averages 24,000 gallons per week.

Switchgear

When the further extensions were contemplated in 1951/2, it was decided to replace the original switchgear by a new installation. This was, like the old, manufactured by the General Electric Co., and consists of twenty-seven single busbar air-insulated metalclad units arranged for vertical isolation and having a breaking capacity of 150 MVA at 6·6 kV. The oil circuit-breakers are arranged for remote operation.

Prior to the installation of this new switchgear, all the existing controls were grouped on the front of the truck-type cubicles, and with the load growth it was becoming difficult for the operator to obtain a clear view of all the instruments. An entirely new control room has therefore been built well above engine room level and is totally enclosed to reduce noise to a minimum.

In view of the large number of alternators (13) in the station the incommunication and control system became somewhat complex and a trunking system employing p.v.c. cables was introduced. Protective gear and relays were installed and manufactured by the General Electric Co., and it is of interest to note that the complete changeover from old to new system was carried out without hitch, in nine days, with no interruption to supply.

To meet the increased demand, the whole of the Island's distribution system has been heavily reinforced and extended. In 1950, Henley's laid approximately 9,000 yds of 0·2 sq in. 11 kV and associated pilot cable. Five new primary substations were constructed en route all of which are equipped with modern type switchgear of Long and Crawfords manufacture. In addition to this ring main section, no fewer than 11,350 yds of e.h.v. cable have been laid since 1948.

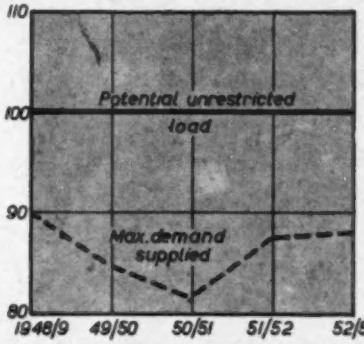
B.E.A. PLANT PROGRESS

When to replace old sets is discussed in lecture to A.S.E.E. Branch

FIVE years of nationalisation has been the theme of quite a few pamphlets in recent months, following publication of the fifth reports of the B.E.A. and the area boards. It was taken up again last week by Mr. Vernon Clements, Deputy Commercial Manager of the B.E.A., in a lecture he delivered to the Central London Branch of the A.S.E.E.

Much of what he had to say was inevitably a repetition of the general information which the reports had conveyed, but on several topics Mr. Clements carried his arguments further. His consideration of new plant provides an example. At the present time there are 418 generating sets and 739 boilers in operation which are 25 or more years old. Not until the amount of new plant available in each year exceeds the amount needed to close the gap between generating capacity and potential load, can a serious effort be made to displace the old plant.

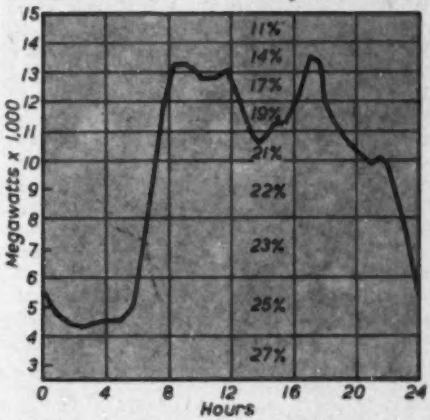
In this respect, the proper time to replace serviceable plant of low efficiency is an interesting study. For example, the installation of 27% efficiency plant to replace, say 15% plant will not only justify the new plant running at a higher load factor than the old; it



Output capacity of the B.E.A. shown as a percentage of the potential unrestricted load

will also justify its running at a higher load factor than other plant of less than 27% efficiency. This other plant thus has its hours of operation reduced. The resultant redistribution of capital costs and operating costs has to be investigated, for the only true test of the value of replacing old plant must be the effect of such a step on overall costs.

Turning to tariffs, which he naturally discussed at some length, Mr. Clements recalled that the 1947 Act laid upon the boards



The bands on this typical B.E.A. load curve show the average thermal efficiency of plant brought into operation as the demand increases step by step

the duty of simplifying and unifying tariffs, and made it far more difficult for them to provide supplies at special tariffs under agreements.

In conclusion, the lecturer's remarks on costs of supply may well be considered. The relatively modest increase in the price of electricity over recent years compared with other commodities he considered to be due in

30-YEAR COMPARISON OF PRICES

		1922/23	1952/53
Av. cost of fuel per ton (inclusive) ...	d./ton	245	750
Av. cost of fuel per unit s.o.	d.	0·3705	0·4632
Total number of units sold	kWhx10⁹	3·76	52·26
Annual load factor (based on aggregate of M.D.s) ...	%	28·3	42·9
Average price per unit sold ...	d./kWh	2·07	1·311

the main to three features which will have diminishing effects.

The table shows strikingly the change of costs, etc., over 30 years. Had the industry not been allowed the freedom to expand, which some would deny it today, it could not have achieved the remarkable results that the table shows.

Minimising Fuel Wastage

Fuel Efficiency Ideas Exhibited at Manchester

EXAMPLES of electricity's diverse contributions in the national drive against fuel wastage were to be observed at the Fuel Efficiency Exhibition which opened yesterday at the City Hall, Deansgate, Manchester. Organised under the auspices of the Combustion Engineering Association, the exhibition ranges over many aspects of fuel conservation, from boiler plant to domestic heating, whilst the lesser object, that of reducing atmospheric pollution, is not ignored.

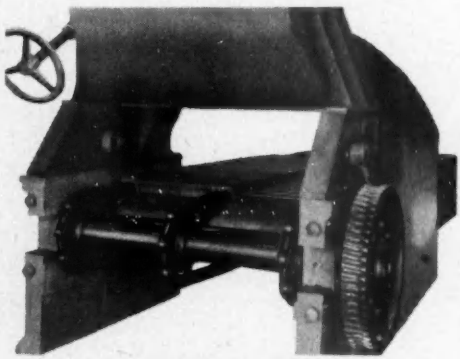
Setting the general theme of electrical exhibits is the motif of E.D.A.'s stand—"Electricity, a power of good for greater productivity" which focuses attention on electrical aids to industrial efficiency. Dominating their display is a working 50-ton fully-automatic press for plastics moulding. Other displays exemplify electrical heating methods, particularly uses of infra-red heating and induction heating.

Efficient fuel combustion in power stations forms the plank of several displays, especially that of the North Western Division of the B.E.A. It illustrates, by both models and diagrams, not only efficient combustion, but the work of chemists in power stations and training of stokers. By no means least is the feature indicating the Authority's attack on atmospheric pollution. On another stand, the Authority—in conjunction with the C.E.A., depicts future possibilities for electric power.

Together with four associated companies, Babcock and Wilcox direct attention to efficient combustion in steam raising plant. Developments by the parent company in plant for handling washery slurry for boiler firing are featured in the form of a working model of rotary hopper and conveyor. Another exhibit of note on this stand is the "Oldbury" chain grate stoker with ash extractor, for shell type boilers.

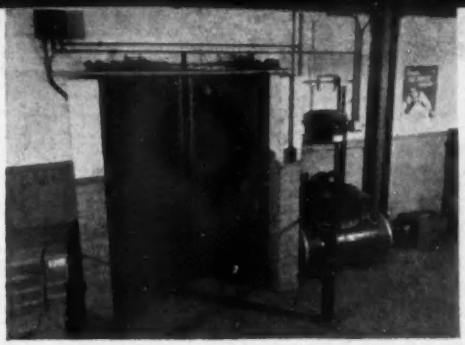
Central feature of International Combustion's stand is a scale sectioned model of this company's installation at Drakelow Station supported by a model demonstrating p.f. fired corner-burners in a water tube boiler setting. Associated with I.C.L. are the Riley Stoker Co. showing a selection of mechanical stokers and the Rhymney Engineering Co. whose colliery surface car circuit demonstrates activities in mechanical handling. Illustrating the range of plant and services provided by the Simon Engineering Group in the efficient use of fuel is a display by Simon-Carves Ltd. and Simon Handling Engineers Ltd. Numerous models of colliery surface and coal washing equipment, power station boilers, flue dust electro-precipitators and other equipment provide indication of their activities in this field.

A comparatively recent development of John Thomson (Triumph Stoker) Ltd. is the carrier bar, travelling grate stroker for shell type boilers which this company features. Having separate grate units carried on supporting rods passing through the three Renolds chains, the design is aimed at simplifying maintenance, in addition to ensuring efficient combustion. Another aspect of fuel efficiency is seen in the models of economiser units being displayed by Senior Economisers Ltd. Each element is a horizontal gilled tube to minimise maintenance.



Feed end of John Thomson's carrier bar, travelling grate stoker for shell type boilers

Auxiliary equipment for steam generating plant, in the form of mechanical draught fans among other items, is shown by James Howden and Co. Shell Mex and B.P. Ltd. demonstrate the work of their fuel efficiency officers in the study of producing greater heat-output from fuel oil.



Here can be seen a typical installation of Radiovisor's photocell controlled, door-opening unit

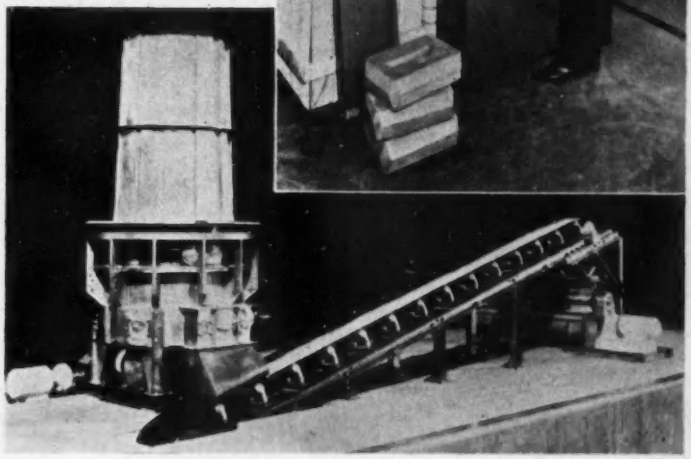
Turning to industrial applications of electricity for obtaining efficient operation, one particular field is that of control. Controllers for varied uses are being shown by Radiovisor Parent Ltd., among which is their automatic door opening equipment, designed to minimise loss of warm air from workshops. For temperature control, Fielden (Electronics) Ltd. show a capacitance relay which, in conjunction with a standard mercury thermometer, may be used as a controlling instrument. Equipment for analysing flue gases to ensure correct combustion is displayed by Elliott Brothers (London) Ltd. Both indicating and recording instruments are incorporated in the gear, which measures carbon dioxide and monoxide, hydrogen and flue gas temperature.

Another aspect of efficient fuel usage in industry is electrical power equipment, which in the case of Lancashire Dynamo and Crypto Ltd. is demonstrated by displays of motors, including a partly wound stator to show construction of their 400 h.p. two speed "Corcooled" motor. Featured on Foster Transformers Ltd.'s stand are their voltage regulators, demonstration exhibits including constant voltage transformers and automatic voltage regulators.

Motor control equipment occupies a prominent place on George Ellison's stand, where a demonstration unit shows the action of solenoid-operated, over-current releases. An example of the efficient use of electric heating is the "Junior" model shaker hearth furnace which is shown in operation by the Electric Resistance Furnace Co.

In domestic and commercial fields of application electric heating is shown in its varied forms. In one example, the North Western Electricity Board demonstrate the cooking of a meal for four persons with an electrical consumption of 1¼ lb of slack coal. For space heating, Ferranti Ltd. exhibit their latest range of radiant fires, designed to give immediate comfort with convenience of siting.

Low surface heat units for convection heating are featured by Dimplex Ltd., whose display of fluid filled radiators includes their recent 1¼ kW model introduced this year. Yet another type of efficient space heater is the thermal storage unit, in which the General Electric Co. have their "Nightstor", consuming power only at off peak periods.



On the right, a G.E.C. "Nightstor" thermal storage heater is being assembled, and left, a model of the Babcock and Wilcox rotary hopper and conveyor plant for handling washery slurry

Benefiting the Horticulturist

Electrical equipment and developments for horticulture

AT the British Electric Power Convention this year, it will be remembered, the potential electrical load in horticulture had been estimated at some 700 MW, annual consumption being 775 million kWh. With this reminder of the scope for electrification in horticulture, Mr. F. E. Rowland, M.I.E.E., M.I.B.A.E., introduced his paper dealing with electrical equipment for horticulture to a joint meeting of the Association of Supervising Electrical Engineers and the Institution of Engineers-in-Charge last Tuesday. Moreover, growers are obliged to keep abreast of technical advances in fields affecting them. Hence the industry which takes the trouble to keep them informed of such developments is likely to reap the greatest reward.

The most obvious application of electrical energy is that of providing adequate lighting. Sufficient consideration must be given to its use in new installations—the small amount of extra trouble and cost to ensure that lighting is sufficient in quantity and layout is always well repaid. Another economical application is in the provision of power for water pumping. Water taken from the public supply may cost 1s. 6d. to 2s./1,000 galls, but with a suitable pumping plant the cost may be as low as 6d./1,000 galls, showing a saving of up to £10/acre/year. It has the additional advantage of giving freedom from restrictions during droughts for both supply systems and irrigation purposes.

Space Heating Methods

Where space heating is concerned, the traditional method for glasshouses is by low pressure hot water fed from a boiler in a sunken stokehold. Their efficiency can be improved by the introduction of accelerators or circulating pumps. Compared with gravity flow the temperature difference between flow and return can be as little as 15° F. Quicker reaction to changes in ambient temperature is a further advantage. The installation of automatic stokers (though only economical for large nurseries with a central boiling plant), is an aid to labour and fuel saving. In small installations efficiency and temperature control can be considerably improved by the use of forced draught fans.

Although electricity cannot compete in price with hard fuel, it provides a convenient form of space heating—particularly those situations in which ease of control and absence of labour are predominant features. Tubular heaters, generally used for glasshouse heating, are usually rated at 60 W/ft run in single tube. Use of thermostats of the rod type with a differential of ± 2° F are most suitable for temperature control. They must be sited with care, to ensure they react to the average temperature of the house.

Low voltage heating, provided by grids of galvanised steel conduit energised via a transformer, is a useful form of space heating occupying little space. Robustness, resistance to corrosion and rapid response to thermostatic control are advantages to be weighed against higher capital cost.

Soil Warming

No discussion of electric heating would be complete without consideration of electrical methods of soil warming, which has been in operation in this country for over twenty years. Particularly effective for propagating seedlings and cuttings, soil warming gives the grower a certain and easy control of growth. Equipment most widely in use comprises transformers and galvanised iron wire energised at 15 V.

One of the most notable developments in electrical aid to horticulture is the practical application of artificial illumination to control photo-periodism and photo-synthesis. Considering the former, the effect on plant growth of the relative number of hours of light and darkness each day, it is possible with supplementary low intensity lighting to retard or advance plant development. Both strawberries and chrysanthemums have responded readily to this treatment.

Photo-synthesis on the other hand, affects plant nutrition and can only occur if light and chlorophyll are present to combine water present in the plant with carbon dioxide present in the air. Intensities of illumination of some 350 L/sq ft are required, and as blue light between 4,300° A and 4,900° A gives good results, 400 W h.p. mercury vapour lamps are a commercial proposition. One such installation is that at Vines Cross Nursery, Sussex (described in the *Electrical Times*, Dec. 11, 1952, and Oct. 29, 1953).

Production at Enfield

Thorn's techniques for fluorescent lamps and t.v. receivers

RECENT alterations at the Enfield factory of Thorn Electrical Industries Ltd. have permitted an extension to the two major manufacturing units there. These are the television and fluorescent lamp sections which, with other units embracing telecommunications, radar and electronic test-gear, fluorescent, phosphors and fine chemicals, automatic machinery, make up this company's activities at Enfield. At a recent visit to these works was observed much of the work involved in the production of television sets and fluorescent lamps.

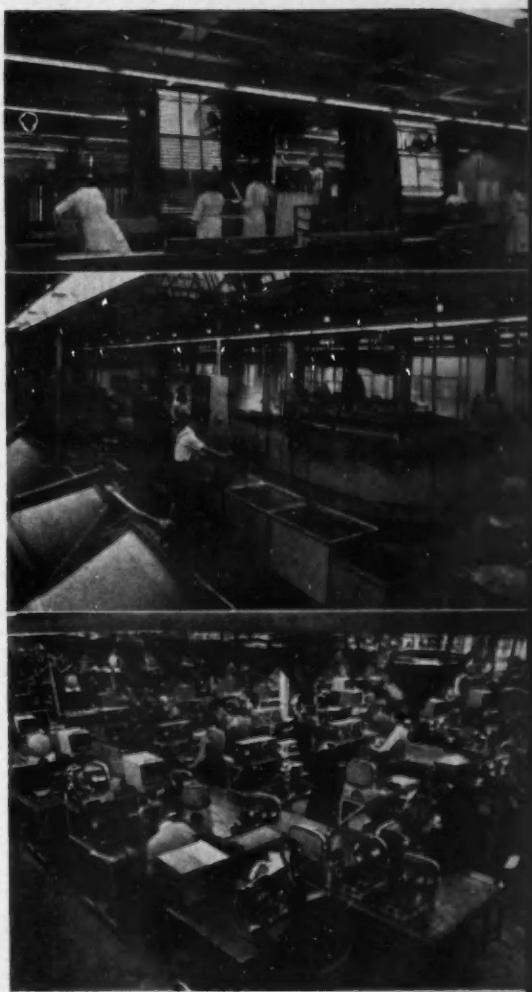
In the manufacture of fluorescent lamps, tubes are received already formed to length, waisted at each end. After thorough washing in clean warm water they are passed into the coating room. Coating is effected by injecting the material into the upper ends of vertically stacked tubes, whilst the consistency of the suspension is adjusted so that drying progresses down the tube before the phosphor drains to one end. After baking to remove the phosphor binding material, tubes are inspected for flaws and then passed to the final production stage. Here they are mounted vertically on a multi-head machine which fixes into each end the filament assembly and evacuates each tube using argon and single stage mercury injection techniques.

Production of "Ferguson" television receivers commences with chassis manufacture, which is accomplished in four stages, with 120-ton presses. Dividing the work thus ensures that any breakdown in one stage does not cause a major production delay. Completed chassis are passed into the plating shop where in automatic plating processes they receive a 0·0003 in. cadmium coating.

Four main assembly lines handle the company's standard t.v. receivers, a fifth being used for special models to be installed in fringe reception areas. Apart from wiring and soldering components into the chassis, sub-assemblies are also fitted. Of these, the five channel input unit is a typical example, it being fitted complete after having been tested. On completion of the chassis assembly, the receiver receives two preliminary tests in which r.f. and i.f. stages are aligned.

In the final stages, each receiver is again tested using the standard test card to enable picture quality to be assessed and a combination of B.B.C. transmission and monopitch note for sound. Each of the five t.v. frequency channels are also tested.

Here are seen three production processes at Enfield. From top to bottom; ageing, inspection and testing of fluorescent lamps; automatic plating; and t.v. receiver alignment



overseas news

A Grid for Quebec

An agreement has been signed between the Quebec Hydro-Electric Commission and the Gatineau Power Co. providing for the construction of a new power network to supply western and north-western Quebec. It is also planned to construct a power network to link eastern and western Quebec. This scheme scheduled for operation with the completion of the Bersimis River hydro-electric project, will thus provide a province-wide power transmission network. This announcement has been made by Mr. Duplessis, the Premier, who has also revealed that the Quebec Hydro-Electric Commission has decided to harness immediately 1,200,000 h.p. from the Bersimis River project instead of reaching that figure in stages. Original plans were to provide 300,000 h.p. of plant initially. It is now considered that the full-scale development involved will prove cheaper in the end. Previous estimates put the cost of the project at between $175 million and $180 million. Potential power capacity of the river is considered to be 1,750,000 h.p.

Threat to Vancouver

Unless there is an early improvement in precipitation and run-off conditions, Vancouver Island faces the threat of a power shortage next winter, according to an official of the British Columbia Power Commission. Installed capacity of the Commission's John Hart development on the Campbell River is now sufficient to meet the demand, but there have been delays in obtaining necessary additional water storage, apparently. Installation of two new 28,000 h.p. generating units have raised the plant's capacity to 168,000 turbine h.p. (120,000 kW). A record peak demand of 98,300 kW was met on October 23 last.

Plant at Windsor

A few weeks earlier than had been anticipated, the fourth English Electric turbo-alternator at the J. Clark Keith steam power station of the Hydro-Electric Power Commission went into full commercial operation about the middle of last month, we are now informed. As we reported last week, this station on the Detroit River has reached its planned capacity of 264 MW, with four English Electric sets.

Tidal Power Scheme

The proposals of Electricité de France to exploit the tidal power at the mouth of the Ranee, in Brittany, have now been approved by the municipalities involved, and it is expected that work will shortly commence on the scheme. The projected barrage, which will be constructed above the towns of Saint Malo and Dinard, will separate from the sea a basin with a 15 square mile surface. Annual output of the hydro-electric plant is estimated at about 550 million units. The Ranee project has been under detailed survey since 1941, a single cycle ebb-tide being considered preferable in this instance. Under the original plans it was proposed to install twenty 18 MW generators.

Spain's Industry

Indicative of the development of Spain's electrical manufacturing industry is the news that the largest 3-phase transformer ever built in that country has just been completed at Galvido, Vizcaya. Of 45,000 kW capacity, it has been constructed entirely by Spanish labour using local materials, and is to be installed in Castellon de la Plana at the terminal of the Escatron transmission line.

Another Scheme

A scheme has been submitted to the Greek Government by a Swiss finance group co-operating with a French Construction firm, we understand, proposing a hydro-electric project on the Megdova River with an installed capacity of 84,0000 kW. The station would be operated by the Public Power Corporation. The group have offered to construct the project on long-term credit, it is reported. This project, which is part of the Acheloos scheme, has already been included in the Government investment programme, it is associated with the Karvitsa irrigation plan.

Uganda Supply for Kenya

Agreement in principle has now been reached in plans for the Uganda Electricity Board to provide a bulk supply to the East African Power and Lighting Co. Ltd. The latter will distribute the power in western and central Kenya, it is stated. Major C. M. Taylor, chairman of the East African Power and Lighting Co. Ltd. revealed last month that the Uganda Board had approached the company with a proposal for the latter to take a bulk supply in Nairobi. Further technical details have yet to be finalised, we gather, and final approval is subject to a report to be submitted by an independent consulting engineer. For the Uganda Board it will be an important development, for they are anxious that full use should be made of the power which will be available when the Owen Falls power station commences operation in the near future.

Palestine Talks

Further discussions are now taking place between representatives of the Palestine Electric Corporation Ltd. and the Israeli Government, concerning an agreement providing for the latter taking up a partnership in the company. After deliberations last week it was announced that the Israeli Government were not prepared to accept the changes, amendments and additions which it had been found necessary to introduce into the earlier agreement which provided for the Government assuming a 50% partnership. The alternative proposal, now for consideration, would permit the Government to purchase the majority of the company's shares under certain conditions which are now subject to the deliberations of the corporation's shareholders. Part of these proposals are believed to concern the terms of payment in instalments, it is reported.

A Fan Deputation

A deputation of the Amritsar Electric Fan Manufacturers' Association, recently met the District Industries' Officer to draw his attention to the "sad plight of the fan industry." The industry, before partition, had an invested capital of Rs. 2 crores, he explained. Seventeen factories were producing 50,000 fans a year and employing 6,000 workers every day. Owing to difficulties in obtaining raw materials and the loss of markets after partition, the number of factories had been reduced to five and the annual output to only 3,000 fans. The labour strength was limited to barely 200 workers while the absence of skilled labour was another handicap. To save the industry from its present plight, the deputation suggested immediate Government patronage of Amritsar products; standardisation of goods by legislation, cheaper transport facilities, technical guidance and financial aid. The District Industries' Officer promised to convey their difficulties and suggestions to the Government.

Lamp Development

To put Pakistan's electric lamp industry on a firmer footing, Hyesons Ltd., the local manufacturers of such lamps, have combined with certain concerns in the E.L.M.A. group in the formation of a new company with the title of Electric Lamp Manufacturers (Pakistan) Ltd., which, initially has a capital of Rs. 50 lakhs. Of this sum, Hyesons are contributing 70%, we learn, while the E.L.M.A. firms will provide the remaining 30%. The British firms involved in this project are B.T.H., Crompton Parkinson, G.E.C., Philips and Siemens, we understand.

Action in Madras

An action began in the Madras High Court last week in which the Madras Electric Tramways Co., and its receiver, Mr. P. G. Brookes, was sued by the State government for the recovery of Rs. 926,000 for electricity charges claimed as due by the government. The latter also applied for the attachment of all properties of the company towards payment of dues. It may be recalled that the Madras government last month cancelled the licence of the Tramway Co. (which is British-owned). The company had, in fact, suspended its tram services in the city last April because of substantial losses it was incurring.

Bunbury Extension

A third 30,000 kW generator and two more boilers are to be installed at Bunbury power station by the State Electricity Commission of Western Australia. This expansion has been approved by the State government, Mr. Tonkin, the Minister for Electricity, has announced. The Commission had submitted figures which indicated that foreseeable consumption would increase so rapidly that to ensure continuity of supply the new generating unit would be required in 5 or 6 years, which was approximately the period required under present conditions to put such plant into commission, he explained. It was the Government's policy to keep a safe margin of reserve generating capacity

A Co-operative Scheme

With little early possibility of connection to the South Island power network, residents of the Harihari district, New Zealand, have formed a syndicate to provide their own electricity supply, utilising the upper reaches of rivers. Consulting engineers were appointed, and after receiving their report, it was initially proposed to develop 100 kVA to supply 70 consumers with nine miles of transmission line, at a cost of £12,000. A company was formed with an issued capital of £15,000 but this was over subscribed to such an extent that it was found necessary to raise the capital to £2,000 and at the same time increase the size of the generating plant and mileage lines to supply additional residents. The present scheme is for a 240 kVA plant, supply 140 consumers, including a dairy factory and a box factory, involving 20 miles of line. A slow speed alternator has been obtained from a Power Board's surplus standby plant, and a 400 h.p. Pelton wheel is being made at Oamara. The residents are building the intake race, laying piping, and erecting poles and wires under the direction of experienced tradesmen The plant is expected to be in operation before the winter of 1954.

A Bright Outlook

Within the next few years the Central Waikato Electric Power Board, New Zealand, will be called upon to supply to about 1,000 State houses in the Melville area, Mr. C. L. Water, engineer-manager of the Board, has revealed during a discussion concerning the extension of transmission lines. At present Melville's demand is about 500 kVA, but the State houses would mean an additional 2,000 kVA. It would probably be necessary to extend the 33 kV line, and he is to ascertain the likely cost of lines and substations.

PERSONALITIES IN THE INDUSTRY

Mr. W. L. Beeby, O.B.E., M.I.Mech.E., M.I.P.E., Assoc.I.E.E., has been appointed a director of the Edison Swan Electric Co., Ltd., and, as director, will be in charge of manufacture. Educated at Bromsgrove County High School and Birmingham Central Technical School, he gained early engineering experience with the Austin Motor Co., Ltd., before joining the Metropolitan-Vickers Electrical Co., Ltd., in 1938 as works engineer with responsibility for design and execution of building and plant extensions (including aircraft factory) and provision of dispersed manufacturing units to meet wartime requirements. He was also responsible for reconstruction work after air-raid damage to factories and, later, for re-converting all units to peacetime production. During the war he was chief A.R.P. officer of the Metropolitan-Vickers Electrical Co. In 1945 he was awarded the O.B.E. for his services as chairman of the Executive Committee of the Manchester Local Reconstruction Panel, an organisation originally formed for the emergency repair of bomb-damaged factories. Since the war Mr. Beeby has been engaged on enlarging and re-equipping Met-Vickers' factories. In 1949 he joined a delegation of three sent to India by A.E.I. at the request of the Government of India to advise the establishment of a heavy electrical manufacturing industry in India.

Mr. W. L. Beeby

Mr. A. Robertson, previously assistant to the power station superintendent at Bath generating station, South Western Division, B.E.A., has been appointed deputy power station superintendent at that station.

Philips Electrical Ltd. announce the appointment of a new radio and television representative who will operate in Lancashire and Cheshire. He is **Mr. R. Benson,** who previously represented Vidor Ltd. in South Lancashire, Cheshire and North Wales. Prior to that, he was a district manager in the North-west for Hussmann British Refrigeration Ltd. Mr. Benson takes over the territory operated by **Mr. H. L. Adderley,** who was recently appointed Philips northern sales executive.

After a five-weeks' business tour of Canada, **Mr. Miles Beevor,** managing director of the Brush Electrical Engineering Co., Ltd., returned to London, via New York, on Wednesday of last week.

Appointed as establishment officer to the Yorkshire Electricity Board is **Lt.-Col. H. E. A. Donnelly,** M.C., who is now staff officer of the Northmet sub-area of the Eastern Electricity Board. He takes up his new duties on December 1. Col. Donnelly joined the former Northmet Power Co. over 20 years ago, and was assistant staff officer for many years, being appointed to his present position in 1948. Keenly interested in the Territorial movement, he is in command of the 101 Field Engineer Regiment of the 56th London Armoured Division. Incidentally, he was in charge of one of the largest demolition jobs at the end of the war—the blowing up of the U-boat pens at Hamburg and Kiel.

Lt.-Col. H. E. A. Donnelly

Appointed as deputy station superintendent at Wolverhampton power station, Midlands Division of the B.E.A., is **Mr. R. A. Jackson,** A.M.I.E.E., who was previously boiler operation engineer at the Portsmouth generating station, Southern Division, B.E.A.

Mr. G. Pawlyn has been appointed deputy-chairman of Ransomes Sims and Jefferies. He succeeds **Mr. J. H. W. Pawlyn,** who has decided to give up that post, but will remain a director of the company.

It is announced that the Minister of Fuel and Power has re-appointed **Mr. H. Nimmo,** C.B.E., M.Inst.C.E., M.I.E.E., M.I.Mech.E., as chairman of the Southern Electricity Board, and **Sir Joseph Hallsworth,** M.A., as chairman of the North Western Electricity Board. It is also announced that the Minister has appointed **Lt.-Col. J. F. Williams Wynne,** D.S.O., to be a part-time member of the Merseyside and North Wales Electricity Board.

Mr. H. Nimmo

Sir Joseph Hallsworth

Nominated to be the first chairman of the Atomic Energy Corporation, which is to be established in accordance with proposals set out in the Government's White Paper issued last week (see page 942), is **Sir Edwin Plowden**, who since 1940 has been almost continuously in the Government's service in posts of high responsibility. In March 1947 he became chief planning officer and later chairman of the Economic Planning Board at the Treasury. Earlier this year he announced his intention to resign his Treasury appointments to resume his private business interests on October 31, but by that time he had accepted this new interim appointment on the staff of the Lord President of the Council. In this he will assist **Lord Salisbury** with work incidental to the establishment of the new organisation for atomic energy, and will assume the chairmanship of the new Corporation when that is formed.

District manager at West Bromwich to the Midlands Electricity Board since last April, **Mr. T. G. Clarke**, B.SC., A.M.I.E.E., is relinquishing that position at the end of this month. He is leaving the industry and will start up business on his own account, we understand. Prior to going to West Bromwich in April, Mr. Clarke was district manager at Bilston.

Mr. R. W. Allen, B.SC.(Eng.), A.M.I.E.E., has been appointed North-East area representative for Nife Batteries Ltd., in succession to **Mr. S. K. Hodgkinson**. Mr. Allen, who has spent five years in the company's Technical Sales Department, has been especially concerned with the application of batteries and charging equipment for switchgear operation, emergency lighting and marine duties. In his new duties he will cover Northumberland, Durham, Cumberland, Westmorland and parts of Yorkshire.

Mr. W. G. Baillie, who went from Persia to Lerwick two years ago as assistant area manager for the North of Scotland Hydro Electric Board, has been appointed engineer-in-charge of the peat-fired turbine power station now under construction at Altnabreac, Caithness. He is succeeded at Lerwick by **Mr. J. T. Tulloch**, who becomes generating engineer at the station.

Mr. L. W. Robson, chairman of Associated British Engineering Ltd., left London Airport on Monday for a three weeks' tour of Africa.

OBITUARY

Mr. H. Grimshaw, manager of the Contracts Department in the Trafford Park Works of Lancashire Dynamo and Crypto Ltd., died on November 12, aged 60. He joined that firm 42 years ago on leaving the Manchester College of Technology and served continuously in various appointments in the contracts office before becoming manager in 1947.

Mr. H. Williams, who died on November 10, aged 80, was financially involved in a number of American electricity supply undertakings.

Dr. H. E. Ives, who died in New Jersey on November 13, aged 71, was early associated with the development of television in America.

Investigating Tracking

INVESTIGATIONS with solid insulating materials to determine susceptibility for tracking form the subject of two recent E.R.A. reports. In the first (Ref.: A/T136), the main concern is with variables in the test for susceptibility to tracking, endeavouring to specify conditions to ensure evaniminus reproducibility of results.

The test discussed in the report is "contaminant" method which a previous report suggested should be accepted for assessing merits of insulating materials at mains voltages. Fixed conditions were specified for carrying out the recommended test but in the absence of definite information, equal importance had to be attached to each variable. Details are given in this report.

Briefly, the "contaminant" method of testing requires that the material be placed under two concentric electrodes, one of square ended rod form, the other a ring of square cross-section. A contaminating material (0·25% sodium chloride solution) is allowed to drop at a given rate on to the surface of the material, provision being made to adjust the drop size. After checking the drop rate, the electrodes are short circuited and the impedance of the circuit (which is energised at 230 V) is adjusted to obtain a current of one amp. The circuit is then opened, shorting bar removed, and three drops of the contaminating solution allowed to fall on to the insulant before reclosing the circuit. Further drops are allowed to fall until tracking takes place, indicated by a current of 0·7 amps of duration greater than 8 mins.

The report discusses each of the variables in turn before considering tests carried out to examine each separately. Experiments were designed to discern the effects of electrode separation, material and pressure on the insulant and simultaneously the effects of drop rate, drop size and voltage. Although these latter are probably the most important variables, their "interaction" demanded their collective examination.

D

B.E.A.M.A. DINNER

WITH over eleven hundred present, the B.E.A.M.A. annual dinner certainly justified its position as one of the premier events of the electrical calendar. Owing to the dictates of parliamentary whips, the programme of this important function was rearranged to give priority to the toast of the "Electrical Industry" which was proposed by the Minister of Supply, the Rt. Hon. Duncan Sandys.

The electrical industry is very young, he said, for the first electrical dinner was reported as recently as 1749 when Benjamin Franklin provided a turkey that had been killed by electric shock and other electrical wonders! Today electricity is vital to the housewife, to industry, and not least, to the Exchequer, for its part in the country's exports. The secret of its success was its never failing attention to research and there was no industry where it was more necessary to look ahead. Speaking of atomic power he referred to the experimental plant in Cumberland. It was hoped to start soon on the first full scale breeder pile. Now that atomic energy is emerging from the experimental stage there will be even wider scope for the electrical industry, particularly in its co-operation with the Atomic Energy Corporation to be set up.

In replying, the President, Sir Harry Railing, jocularly mentioned the subjects he was not going to discuss. He would not refer to the supreme need to build up to 2,000 MW of plant and gear, nor of the limitations that were put on the use of electricity. Electricity must be as free in the home as in the workshop. Turning to the toast, he gladly accepted the Minister's tribute to the industry, especially in view of the misunderstanding about trade organisations. He asked that they be judged by their motives and their overall effect on public welfare. First of all, jointly with the B.S.I., they laid down standards of quality and developed co-operation in industrial research. They started their educational committee before any other industry and not least, their export committee also. As a result this country shared with the United States the position as the leading electrical exporting country. This industry had been built up with an eye to the whole edifice and we are proud of it, for it is our faith in our world mission which has enabled us to erect and maintain the industry which can stand four square to the world.

The Chairman of the Council, Mr. D. D. Walker, proposed the toast of "Our Guests", referring to the wide field from which the guests had come. In particular he mentioned education and the recent endowment of a Chair of electrical engineering at Cambridge. The rosewater bowl and ewer which commemorate this endowment were on display at the dinner. The reply to the toast was by the Rt. Hon. Henry Willink, Vice-Chancellor of Cambridge University, who paid tribute to the wide educational activities of the Association and to the great benefaction of the permanently endowed Chair of electrical engineering.

NEW LITERATURE

Atmospheric Electricity

by B. F. J. Schonland, C.B.E. F.R.S.

IN this excellent little book is given a concise and admirably clear position of the present state of knowledge of this subject. Its style is largely non-mathematical and is such to hold the reader's interest from the first word to the last. By way of introduction, the book opens with a thorough discussion of the ionisation of the atmosphere, together with methods for the practical determination of the extent of ionisation. This leads naturally to a consideration of electric fields and electric currents in the atmosphere giving details of measurement of potential gradients and discussing its variations with locality, time and season. Thundercloud electrification is then explored, followed by explanations of lightning discharge and charge generation in clouds. Published by Methuen, 95 pages, 6½ in. by 4½ in. Price 7s. 6d.

Plastics Progress 1953

Ed. by P. Morgan, M.A

AN up-to-date report on branches of plastics technology, this book reproduces in full papers and discussion at the British Plastics Convention 1953. As one would anticipate, the field covered is extensive, although greater emphasis is given to developments in technology which have occurred since 1951. In particular, considerable progress has been made in the fields of unplasticized p.v.c. and reinforced plastics and the attention given to these two subjects in the book reflects this progress. Other sections are concerned with plastic material developments, notably in silicones, and durability and performance—also associated with those chapters which discuss selling plastics products to the public. Production problems are considered whilst the book is brought to a close by an instructive series surveying new uses of plastics in industry, making reference to its employment in telecommunications cables. Published by Iliffe, 439 pages, 9½ in. by 6 in. Price 50s.

The BUYER'S *Column*

E.L.M.A. Lamp Prices Increased

FURTHER to our note in last week's issue received as we were going to press we give below full details of increased prices announced by the member companies of the Electric Lamp Manufacturers' Association.

Clear and Pearl 15 and 25 W single coil lamps have been increased by 1½d. to 1s. 6½d.; 40 and 60 W clear and pearl single coil lamps by 1½d. to 1s. 4½d.; 40 and 60 W clear and pearl coiled coil by 2d. to 1s. 9d.; inside silica single coil 40 and 60 W by 1½d. to 1s. 7½d.; inside silica coiled coil by 2d. to 2s.; 75 W clear and pearl single coil by 2d. to 1s. 10d.; and coiled coil by 3½d. to 2s. 1½d.; 100 W clear and pearl single coil by 1d. to 1s. 10d., coiled coil by 1½d. to 2s. 1½d.; inside silica single coil by 1d. to 2s. 1d. and coiled coil by 1½d. to 2s. 4½d. 150 W clear and pearl single coil lamps have been increased 1d. to 2s. 7d. and inside silica lamps by 1d. to 3s. 1d. The above lamps in 100/130 V and those in various colour finishes have also been increased. The above prices do not include purchase tax.

Mazda's "Eyeball" Fitting

NOW introduced in the "Mazda" range by THE BRITISH THOMSON-HOUSTON CO., LTD., Crown House, Aldwych, W.C.2, is an "Eyeball" recessed spotlight fitting incorporating a 75 W spotlight.

It is a steel hemisphere with a central hemisphere behind which the spotlight is mounted. This unit rests on a felt ring supported by a steel "halo" plate to be flush with the surface of a false ceiling. The lamp unit rests freely yet firmly on this felt ring and can be trained in a cone 30° about the vertical axis.

There is a grille across the aperture of the lamp unit to protect the glass bulb.

A.E.W. Vertical Muffle Furnace

FOR some types of work a vertical muffle furnace rather than a horizontal pattern is preferred. In the hardening of long slender components, broaches, gears, etc., the work can conveniently be hung on jigs making them more easily handled for quenching and minimising the risk of warping due to lifting as in a horizontal type furnace.

Such a furnace is now supplied by A.E.W. LTD., Imperial Works, High Street, Edgware, Middlesex. Its outer case is made from substantial rolled steel with angle rings at each end. The furnace chamber is built from refractory bars with special grooves supporting the easily replaceable elements. These are of 80/20 nickel chrome or Kanthal A.1 wire. Heat insulation between furnace and outer casing is provided by high grade refractory.

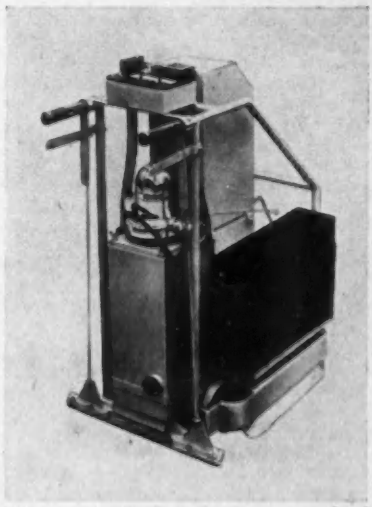
A vertical muffle for hardening work

Temperature control is by automatic controller recommended for continuous use or by energy regulator and pyrometer, these furnaces being suitable for temperature ranges up to 1050° C or 1250° C.

Battery Powered Floor Cleanser

A SELF-CONTAINED battery operated electric floor scrubber and drier has been developed by S. R. COWLAND, LTD., Birmingham Road, Bromsgrove, Worcestershire, and sold by INDUSTRIAL COLLOIDS, LTD., Altrincham, Cheshire.

This model C50A enables one man to scrub clean and dry 500 yards of floor per hour without impeding production in any way. Fundamentally the machine is a cast aluminium base suspended



This new electric floor cleanser is completely self-contained

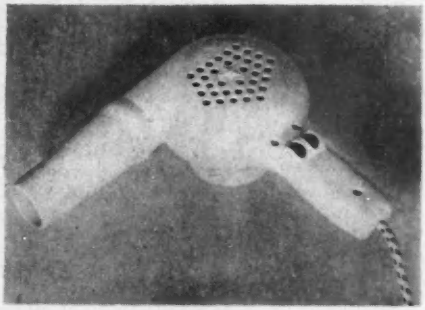
on an adjustable front-caster and two rear wheels on which is mounted a divided tank—one half for the clear solution and the other for dirty water. The B.T.H. 1 h.p. motor is powered by two 12V Exide traction batteries which also power a ½ h.p. suction motor and fan.

In operation the cleansing solution is gravity fed through a sprinkler system in front of the brushes and is gathered in again by squeegees and sucked vertically into the receiving tank. The interchangeable aluminium backed brushes together cover an area of 19 in. wide, being intermeshing star shaped brushes which cover completely all floor area in their path.

"Solis" Model 1051

MODEL 1051 is the latest version of the Swiss "Solis" handryer. This is a lightweight model weighing 1¼ lb, comfortable to hold in one hand and free from vibration or radio and TV interference.

Incorporating an a.c./d.c. motor running at 5/6,000 r.p.m., the handryer has separate switching in the handle for either motor and heating elements. It has a moulded plastic case available in brown, green, and red-mottled in ivory or light brown mottled. Handled in this country by ELECTRO-THERMAL ENGINEERING LTD., 270 Neville Road, London, E.7, the model 1051 is listed at 76s. plus p. tax 14s. 3d.



The new Solis 1051 handryer is a lightweight

TRADE PUBLICATIONS

ACCESSORIES.—In catalogue ACC53 Walsall Conduits Ltd., Excelsior Works, West Bromwich, have illustrated the wide range of switches, socket outlets, plugs, ceiling roses, junction boxes, etc., that they produce.

DISTRIBUTION EQUIPMENT.—Folder 47/A gives details of the new outdoor service fuses suitable for cartridge fuse links just produced by W. T. Henleys Telegraph Works Company Ltd., 51 Hatton Gardens, E.C.1. Folder 43/A gives details of the new Henley multi-way double-pole connector box.

SWITCHES.—The Siemens watertight fuse switch designed for outside use is illustrated in folder Z200 just issued by Siemens Electric Lamps Supplies Ltd., 38/39 Upper Thames Street, London, E.C.4.

MOTORS.—A broadsheet issued by Newman Industries Ltd., Yate, Bristol, gives details of the range of motors produced including the latest additions—motors to draft B.S.S. C.N.(ELE) 6814.

ELECTRONICS.—The Standard Bicera 74704A spark control unit is described in a brochure issued by Standard Telephones and Cables Ltd., North Woolwich, E.16.

GENERATING PLANT.—Combined power and process steam installations giving efficiency and economy are described in a brochure by Ashworth and Parker Ltd., Riverside Works, Bury, Lancs.

TEXTILE DRIVES.—"The Power Behind the Wool Industries," is one of the claims for English Electric equipment according to a recent publication of the same name. Equipment supplied by the company includes generating plant, switchgear, transformers, fusegear, control gear and motors.

DUST REMOVAL.—The removal of dust and noxious fumes, is one of the facets of production of The Visco Engineering Co. Ltd., Stafford Road, Croydon, their work is described in a new brochure, "Modern Dust Collection and Fume Removal."

LIGHTING.—An entirely new illustrated broadsheet and price list describing Sieray Fluorescent Lighting fittings and an illustrated wall chart describing in full their complete range of commercial lighting fittings are two recent publications by Siemens Electric Lamps and Supplies Ltd., 38-39 Upper Thames Street, London, E.C.4.

CABLES.—Attractive new publication by Enfield Cables, Ltd., Brimsdown, Middx, includes EN202 starter, lighting and general purpose cables for vehicles, non-bleeding cables for verticle installations (EN203), shot-firing cables (EN204) and publication ENA108 grid suspension wiring system.

COMMUNICATION SYSTEM.—New publication 1243 is published by Communication Systems Ltd., Strowger Works, Liverpool, to draw attention to the efficiency on staff organisation and work which follows from the use of inter-communication equipment.

DOMESTIC APPLIANCES.—A fully illustrated catalogue showing their range of domestic appliances has been issued by Falk Stadelmann and Co. Ltd., 91 Farringdon Road, London, E.C.

ACCESSORIES.—New autumn 1953 catalogue of electrical accessories has now been published by M. K. Electric Ltd., Wakefield Street, Edmonton, London, N.18.

PLASTICS.—Moulds and moulding is a self-explanatory title to a new brochure from B.I.P. Tools, Ltd., 4 Argyle Street, W.1.

The WEEK in NEWS

More Appliances from the Continent?

Chancellor places Electrical Goods on O.G.L.

RELAXATIONS in the restrictions on imports from Western Europe and certain other foreign countries, promised by Mr. R. A. Butler in Paris at the end of October, were announced last week. The electrical domestic appliance industry is affected considerably as the complete range has now been placed on Open General Licence. Thus the position before November, 1951, when the first restrictions were imposed, is restored, but in addition, space and water heaters and non-domestic dishwashing machines, which were not previously on O.G.L. have now been included in the list of goods which do not require licences.

The complete lists of electrical goods thus affected are given in the Board of Trade's Notice to Importers No. 593. The majority are in Group 12 which includes bells and buzzers, blankets and pads, coffee percolators, cooking and heating apparatus and parts, drink mixers, fans, floor polishes, hairdressing appliances, torches, irons, ironing machines, washing machines, wringers, kettles, lamps, lighting appliances, shavers, toasters and vacuum cleaners. Group 8 now includes all dishwashing machines, all refrigerators and electric typewriters. An amendment to Group 13 has been made to cover all cooking and heating apparatus.

The restrictions on imports were imposed in November, 1951, and March, 1952, as part of measures designed to remedy Britain's balance of payments problem. Between then and now a certain number of appliances could be imported but only under licence and up to a total value; quotas being fixed half-yearly.

Little Evidence of Subsidised Exports

SPEAKING last weekend to the Association of Consulting Engineers, Mr. R. Maudling, Economic Secretary to the Treasury, referred to contracts lost to overseas competitors. He said the Government had seen little evidence that such foreign firms were subsidised by their governments. Often their prices were so low that they must either lose money or increase their estimates, and consequently the present phase was passing, he maintained. Mr. Maudling appealed to consulting engineers to do everything possible to stimulate British exports and obtain contracts for British firms, while maintaining their tradition of impartiality and integrity. He was speaking at the Association's fortieth anniversary luncheon.

MALAYA AMENDS IMPORT DUTIES

THE Malayan Government has recently announced a number of amendments concerning import duties, many of which are aimed at encouraging further importation. Duties on certain electrical household articles have been reduced from 25% to 10%—articles concerned include fluorescent lamps, fans, torches, cooking and heating appliances, washing and drying machines, mixing machines, and motors and compressors not exceeding 1 h.p. Duty on air - conditioning machines have been reduced from 40% to 20%. In addition a duty of 10% has been imposed on refrigerators, freezing apparatus and parts.

Tungsten Ore Prices

A FURTHER reduction in the selling price for tungsten ores of standard 65% grade and ordinary quality has been made by the Ministry of Materials. Price of Wolframite has gone down from 245s. to 225s. and of Scheelite by 20s. to 210s. per long ton unit delivered consumer's works.

The First Half-Century

Everything that Sir Oliver Lodge may say is entitled to respectful consideration. Therefore one must not laugh at, or even express any scepticism respecting his plan for curing London fogs. At the Physical Society he showed again that by electrifying smoke in a bell-glass it could be quickly dissipated. From a bell-glass to London is a long step, but it seems that Sir Oliver once got so far as to clear a space some 60 yds. in radius by means of a Wimshurst machine. Hence he is hopeful that if he can make a break in the fog here and there to let sunlight through, Nature will do the rest. Unhappily he has not the capital to carry the thing out himself, and he finds those who have it, hard to convince that there is money in the venture. None the less, he is assured that some day 'when the country is rich enough,' the experiment will be tried.—*From our issue of November 19, 1903.*

Anglo-Canadian Trade Agreement

IT is reported from Toronto that an agreement has been made between the General Electric Co. Ltd. in this country and the Canadian General Electric Co. concerning the marketing of the former's products. British made telecommunications equipment will be imported into the Dominion by the Canadian company who have undertaken to market, install and service the products. Goods included under the agreement are telephone and telegraph multiplex equipment, V.H.F. radio equipment and high frequency radio receivers.

Possible Extension of Glasgow's Underground

AN inquiry is to be made into the possibility of extending Glasgow's underground railway system. The investigation is to be of a general nature and will not concern any particular area. Consultations will take place with Sir William Harcrow and Partners, of London, a member of which firm had only recently returned from New Zealand where he had been advising the Government on construction of an underground railway in Auckland. The inquiry became necessary because of the serious overcrowding on transport services, where saturation point was being reached rapidly.

OFFICIAL PUBLICATIONS

BRITISH STANDARDS
B.S.113: Packaging Code—Section 4—Mechanical Aids in Package Handling; B.S. Handbook 2: British Standards for Workshop Practice (1953 Edition).

MIN. OF FUEL CIRCULAR 207 and DRAFT STATUTORY INSTRUMENTS. Draft Quarries (Electricity) (Amendment) General Regulations 1953; and Draft Metalliferous Mines (Amendment) General Regulations 1953. (*See page* 947.) H.M.S.O. 2d. each.

ATOMIC ENERGY PROJECT. Future Organisation in U.K. (*See page* 942.) H.M.S.O. 6d.

MAKE YOUR HOUSE COSIER IN WINTER. Prepared by E.D.A., Gas Council and Coal Utilisation Council on Insulation. *Gratis.* (See page 972).

BROADCASTING. Memo on Television Policy. H.M.S.O. 4d.

NATIONAL COAL BOARD SPECIFICATION 850/1953. Price 3d.

CONSUMERS' COUNCIL WANTS 'SMOG' REPORT

AN authoritative report on the dangers of "smog" and the preventative measures taken in the electricity supply industry is being sought by the London Electricity Consultative Council. At the Council's meeting last week, the chairman, Mr. I. J. Hayward, said it would be a good thing to find out if the industry was doing all it could to prevent the fogs. As regards the fact that smokeless fuel was the answer to the problem, the chairman said there was a theory that sulphur oxide was responsible, in which case smokeless fuel would not affect the situation.

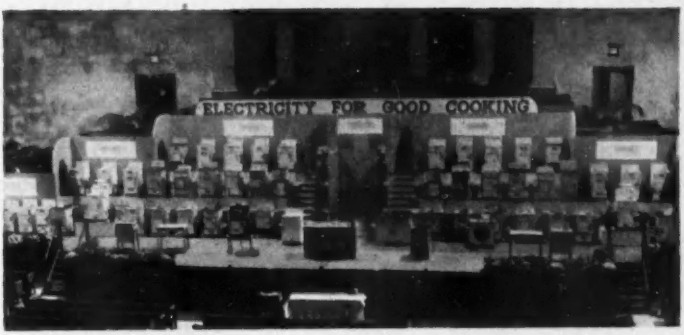
Electronic Dimmers in Lyons Corner House

ELECTRONIC control of cold cathode tubes in three colour circuits is a feature of a new lighting installation in the banqueting room of J. Lyons and Co.'s Strand Corner House. The fluorescent dimming installation is a large scale application of the Thyralux electronic dimming system. The control comprises two directly heated cathode grid controlled thyratrons operating back to back.

A phase shifting arrangement enables an a.c. potential applied to the grids of the Thyratrons to be varied from 0° to 180° out of phase, with the main potential applied to the anodes. The Thyratrons used are capable of controlling 14A, and a short preheating period enables the dimmers to be used 30 seconds after switching on. Design of the high voltage transformers for the cold cathode tubing is such that the Thyralux acts as a current regulator for the greater part of the dimmer travel. The control panel can be plugged in at various points. Each of the three primary colours, red, blue or green, can be dimmed individually or a multiplicity of tones, ranging from pale pink to midnight blue may be obtained by mixing.

The three colour circuits have been concealed in cornices over the dance floor which is about 900 sq ft in area. The cornices form three squares which are separated by rows of small filament lamps enclosed and fitted flush to the beams. Seven pillars around the dance floor have been internally illuminated by 5 ft 80 W hot cathode tubes, and the outer areas of the hall are lit by pendant fittings housing tungsten lamps. All equipment was supplied and installed by Strand Electric and Engineering Co. Ltd.

General view of new lighting installation in banqueting room of Lyons Corner House, Strand, London



View of the stage at the City Hall, Sheffield, before Mr. Philip Harben gave his demonstrations to an audience of some 3,000. Unfortunately the camera could not take in the whole of the stage which extended a further 12 ft on each side

TRADE MISSION TO MIDDLE EAST

A TRADE Mission left London last weekend for a five-weeks' tour of the Middle East, with the object of persuading the countries to be visited that Britain is anxious to help in development work and is able to supply the goods and services needed. The team, headed by Sir Edward Benthall, plans to spend 12 days in Baghdad and a few days each in Kuwait, Damascus, Beirut, Jedda and other centres. Mr. D. Maxwell Buist, export director of BEAMA and chairman of the Institute of Export, is a member of the party. It is hoped to study export opportunities and discover any hindrances to speedy expansion of our trade

Teachers taught about Electrical Housecraft

ONE-DAY conferences on electrical housecraft organised by E.A.W. in Yorkshire and Bath for teachers have proved so successful that others are to be arranged. The third conference is to take place in Liverpool on November 28. To date about 100 teachers in the north-west and North Wales have notified their intention of being present. Subjects will cover use and care of electric cookers, cooking equipment, refrigerators and electrical laundry equipment, and teaching electrical housecraft in schools.

3,000 attend Y.E.B. Cooker Show

STIMULATION of consumer interest in electrical appliances and especially in electric cooking is growing rapidly day by day. The Sheffield sub-area of the Yorkshire Board is one of the latest districts to hold a large-scale demonstration and the City Hall was invaded for a day for the purpose. An attendance of about 3,000 is an excellent gauge of the success of two demonstrations given by Mr. Philip Harben. Our accompanying illustration shows the stage as it appeared when the public were admitted. In all there were 52 cookers displayed apart from those actually used in the demonstrations.

When Mr. Harben had finished, Miss E. Eaves of the E.D.A. spoke on electric cookers and cooking and demonstrated one particular model which is now available to new council house tenants in the city. Apart from the stage display of cookers, another small exhibition of other domestic appliances was held in the foyer. In addition there was a competition in which people were asked to place in order of preference a number of domestic appliances. About 1,000 persons voted and the order chosen was as follows: cooker, washing machine, cleaner, iron, radio, water heater, refrigerator, radiator, kettle, T.V., food mixer and toaster.

Famous Clock has Electronic Chimes

ALMOST as prominent a landmark as Big Ben is the Royal Liver Building in Liverpool. Big Ben is, of course, the bell and not the clock—at the Liver Building, Great George is the clock, but there is no bell. It was suggested that chimes be installed as a memorial to the dead of two world wars. A problem has been solved as weighty bells will not be needed. Instead the chimes will be produced electronically by the striking of special wires less than a foot long, the vibrations being amplified many hundreds of times. Timing of the clock and the chimes is controlled by an electric master clock. Persons responsible for the original building, the clock, and the latest installation, are Mr. McLaughlin, F.R.I.B.A., and Gent and Co. Ltd.

New Showrooms Open in London

ANOTHER new showroom has been opened in London. For some time the Lancashire firm of Belmos Co. Ltd. has maintained a selection of equipment in London, but this was not considered adequate, and a showroom was thought essential. This display is situated at Columbia House, Aldwych. Up-to-date examples of the company's motor control switchgear may be seen, comprising both industrial and flame-proof types, arranged as individual starters and as group motor control switchboards.

National Coal Board Specifies Cables

SHOTFIRING cables are the subject of a specification issued last week by the National Coal Board as P50/1953. It deals with twin cable for single-shot firing and single-core cable for multi-shot firing and is supplementary for this purpose to B.S.7. Conductor construction is specified together with the thickness of the p.v.c. or rubber dielectric, and the external colour in which the cable is to be finished.

North East shows Apathy towards B.I.F.

REPORTS that the 1954 B.I.F. is not receiving the same enthusiastic support as in the years immediately following the war, continue to reach us from various quarters. One received last week concerns the alleged lukewarm attitude in the north-east. It is stated that 600 invitations to exhibit in London were sent out, representing a big increase over previous years, but only "a handful" had accepted. A private survey gained the information that firms in the north-east felt the benefits received were outweighed by the cost of buying space, transport, and keeping staff in London for 10 days or more. It should be remembered, however, that many of the firms in that particular area have London headquarters, where the decisions are made.

Popular Booklet on Insulating Houses

ANOTHER recommendation of the Ridley Committee has now been implemented. The committee's 13th suggestion was that a well illustrated brochure be prepared to show householders how they can easily and cheaply improve the insulation of their houses. Such a booklet was introduced by the Parliamentary Secretary to the Ministry of Fuel and Power, Mr. L. Joynson-Hicks, last week. It was prepared with the joint efforts of the E.D.A., Gas Council, and Coal Utilisation Council, representatives of which formed the Domestic Insulation Committee.

Entitled "Make Your House Cosier in Winter," the brochure deals with all the common causes of heat wastage and suggests numerous remedies — insulating the roof, stopping draughts from doors, skirting, floors and windows, and lagging tanks, cylinders and pipes. The suggested preventative materials, such as blanket, loose fill and aluminium foil, are listed, with names of makers, and approximate cost.

This brochure is intended to help in the insulation of existing houses but the Insulation Committee has now started work on a second pamphlet dealing with the wider field of insulating houses which will be built in the future. A more technical booklet, rather than these popular versions, is also being considered.

Machinery Trades Annual Dinner

LAST Friday evening the Association of Electrical Machinery Trades held its annual dinner, cabaret and ball. Toast to the guests was proposed by Mr. Smith, chairman, who described the A.E.M.T. as doctors of the electrical industry. Providing a 24-hour service, members of the Association were engaged in repairs to electrical plant of all sizes.

In reply Sir Joseph Hallsworth, chairman, N.W. Electricity Board, said the industry had been living under a cloud of power cuts which had done extensive damage to its prestige. Everyone had a part to play in the task of recovery, in which industrial negotiation was vital. Although there would always be differences between unions and employers, the aim of both must be the highest productivity.

Familiar sight at the larger stations of British Railways soon will be new battery-operated electric water tanker trucks. The first consignment of these trucks is seen above at the Sunderland works of the makers, Steels Engineering Products Ltd. With a capacity of 275 galls., these vehicles will be used to replenish water tanks of long-distance trains

E.I.B.A. at Birmingham . . .

WE hear that the sum of £211 7s. 8d. was raised at the Carnival Dance organised last month by the Birmingham branch of E.I.B.A. This amount has of course been added to the Association's funds. The same branch is to hold its annual meeting and luncheon at the Imperial Hotel on December 4.

. . . and at Leicester

AS already announced, the E. Midlands branches of E.I.B.A. are combining to hold a Coronation Year Ball. It will take place in Leicester on December 3 and tickets are available from the local branch secretary, c/o the G.E.C., Queen's Buildings, Rutland St., Leicester.

Warm-white Lamps for Aquariums

OPENING today (Thursday) on the South Bank site in London — underneath Waterloo Bridge—is probably the largest tropical aquarium in the metropolis. The curator is Mr. E. Bowler, director of South Coast Aquatic Nurseries Ltd. of Parkstone, Dorset, who in the course of his travels has collected some 3,000 tropical fish. The new aquarium houses 112 tanks of varying sizes, each containing a different variety. Absence of any natural light has necessitated the complete use of artificial illumination, and in this respect warm-white fluorescent tubes have been used with only one or two exceptions. The lamps are 5 ft 80W Ekco and Atlas tubes. They are situated well above the tanks and in the organisers' experience provide the most suitable and most economical form of lighting. Best, that is, not so much from the fish's point of view, but rather from the viewpoint of stimulating the growth of plant life in the tanks, which is considered most important. The fish themselves have no preferences. Thermostatically controlled heat is provided by units supplied by Unity Heating Ltd. London Electricity Board wired the premises.

Latest addition to the range of display material made available to dealers by Chloride Batteries Ltd. Constructed of strutted strong board, it is 32 in. high and 25 in. wide. Produced at the same time are two colourful showcards featuring cartoons by Robb

Smoke Abatement Soc. forgets Electricity

TWO pamphlets have just been produced by the National Smoke Abatement Society setting out paragraphs and recommendations of the Ridley Committee's report on National Fuel Policy, relating to smoke prevention. One booklet deals with the domestic aspects of the problem and the other with the industrial side. Although admirably achieving the object of abbreviating and popularising a lengthy report, we are not a little surprised to find that any mention of electricity and gas has been omitted entirely from the publications. The wider use of electricity is surely a major contribution to the limitation of smoke.

NEWS IN BRIEF

Next year's summer meeting of the Institution of Heating and Ventilating Engineers will be held at Bournemouth from July 3 to 7.

All restrictions on use of nickel have been removed by the Board of Trade and Ministry of Supply.

Next year's Building Plant Exhibition, organised by the Ministry of Works will be at Reading from June 24 to 30.

Annual exhibition of the Television Society is to be held at the electrical dept. of King's College, Strand, London, on January 7, 8 and 9. About 40 companies are exhibiting.

Oxford University's Dept. of Education announce that a conference on "The Young Worker: Education for Human Relations" will be held between April 3 and 9 next at Manchester College, Oxford. Residential arrangements are being made.

Electrical Trades' Commercial Travellers' Association's annual stag party, dinner-smoker will be held at Windsor Castle Hotel, Vauxhall Bridge Rd., S.W.1, on December 11.

Electricity is being featured prominently in cooking demonstrations sponsored by the British Trawlers Federation. The first demonstration, showing how to make appetising dishes of cod fillets, was at the Electricity showrooms, Blackpool, on Tuesday.

The Brush Group have made a gift of three diesel electric generating sets to the War Office to provide amenities for British troops stationed in Korea.

I.E.E. Measurements Section Dinner

THAT pleasant function, the Annual Dinner of the Measurements Section of the I.E.E., held last week at the Café Royal, was again noted for the bonhomie which has characterised dinners in previous years. In proposing "The Guests," Mr. J. F. Coales, the Section's Chairman combined successfully brevity and pleasantry, paying due compliment to Sir Harold Hartley, Mr. H. Bishop and other guests assembled.

Mr. Bishop, President of the I.E.E., was first to reply, complimenting the Section on a Dinner which was, he felt, an excellent augury for their programme for the coming session. On a wider issue, he stressed the importance of members' support to the Institution by presenting papers.

As Guest of Honour, Sir Harold Hartley's reply attained the high standard of intellect and wit one would anticipate from such as he. His past activities, he reminded his audience, have had measurements as a motive power. Much of his speech was devoted to an entertaining contrast of the two personalities of Davy and Faraday.

Closing this part of the evening's proceedings, Mr. M. Whitehead (Vice - Chairman) proposed the toast to the Chairman; Mr. Coales replied.

Questions in Parliament . . .

Atomic Power Stations

The Minister of Supply was asked on Friday whether in selecting sites for atomic power stations, the needs of Wales would be considered. He said that equal consideration would be given to all parts of the U.K. which offered the necessary facilities.

Replying to other questions on Monday, the Minister said two main projects for the generation of electricity by atomic energy were in hand. An experimental station using natural uranium as fuel was being built at Calder Hall, Cumberland, work having started some months ago. In addition a full scale breeder reactor to produce electric power for industrial purposes was to be erected. Design and planning was well advanced and a number of sites were being considered. Although not wishing to anticipate the decision, the Minister told Mr. Ormond that, as was widely known, one site under consideration was in the Scottish Highlands. He promised a further statement when a decision had been reached.

Fuel-saving Appliances Monopoly

Alleging that restrictive practices prevailed in the production of domestic fuel-saving appliances, Mr. J. T. Price asked last week if the industry could be referred to the Monopolies Commission. Mr. H. Strauss replied that the reference could only be considered if evidence of conditions to which the Act applied existed in the trade.

Electronic Equipment for Army

Was the Army supplied with electronic equipment for operation in the 41-68 m/cs. frequency band? Capt. Orr asked last week. He was told that the frequencies were not disclosed.

D.S.I.R. Expenditure

Mr. Boyd-Carpenter stated in a written answer that a general understanding had been reached between the Treasury and Department of Scientific and Industrial Research which, subject to certain necessary reservations, provided for the gradual expansion of the Department's activities over the next five years. He agreed there had been some slight fall in real expenditure during the past year. The 1953-54 Estimates for the Department, however, provided for an increase in expenditure of about £400,000 over the 1952-53 level.

Purchase Tax

Further questions have been asked concerning requests that announcements regarding alterations in purchase tax rates be brought forward from April to January. In reply it was said that the Chancellor had received a number of representations and that he was bearing them carefully in mind. The matter was an important one and was being studied but no statement could be made at this juncture. Mr. Gaitskell asserted that much of the trouble arose because of rash statements and half statements made by the Chancellor at the time of last year's Budget. Mr. Boyd-Carpenter denied that any such statements were made, and added that no grounds had been given for any expectations of the kind suggested.

Competition in Export Trade

Increasing competition in maintaining our export trade especially from Germany and Japan was the subject of a question by Mr. Lewis. He said those two countries were able to produce the same or similar articles more cheaply and with speedier delivery dates. Mr. P. Thorneycroft said he was well aware of the situation. The Government's policy was to keep the national economy in a healthy condition necessary to enable all concerned to make the greatest efforts. Major responsibility however, rested on industry who had to keep costs down and improve production. Mr. Thorneycroft refused to be drawn when a supplementary question was put placing removal of food subsidies and consequent wage increases as the main cause of higher production costs.

Radio Interference

Mr. G. Williams asked last week whether it could be made compulsory to fit suppressors to all electrical appliances in order to eliminate interference with television. The Assistant Postmaster-General said decisions depended on advice received from Committees set up to investigate the matter, which have not yet submitted a final report. Replying to further questions he said he would be glad if the Committees could report more quickly but there were great difficulties. As regards suppressors on old cars he said it would be practically impossible to enforce such a regulation.

Frequency Allocations

A published list of frequency allocations for both Government and civil use was freely available in the U.S.A. and a similar list in this country would be most welcome, Capt. Orr said at question time. Mr. Gammans replied that consultations were taking place to see what extent such information could be published in the U.K.

Isle of Wight Transmitter

The permanent television station being built on the Isle of Wight was expected to cover the South coast from Lyme Regis to Seaford and would include Hampshire and Dorset, western half of Sussex, and parts of Wiltshire, Somerset, Berkshire, and Surrey, the House was informed last week.

T.V. Station at Plymouth

Outcome of the inquiry in September regarding the site of the proposed Plymouth television station was not yet known, Mr. D. Gammans told the House last week.

Electric Supply News . . .

Eire

With engineers of the Electricity Supply Board at present deciding on the site for the coal-fired power station to be built at Arigna, Co. Leitrim, local miners are pleased at the news that this station will require about 50,000 tons of the locally mined bituminous coal annually.

Dewsbury

Thornhill generating station, near Dewsbury, is expected to be completed by the end of next year. The original station was built on the banks of the River Calder in 1905, and in 1932 the work of extending the station was begun, further additions being made in 1937. In its final stage, on which work is now progressing, the third 45 MW turbo-alternator and eighth 180 klb/hr boiler are being installed.

Gloucestershire

A public enquiry has been ordered by the Minister of Fuel and Power into objections by the Gloucestershire County Council to the B.E.A.'s proposal to construct a 275 kV supergrid transmission line across the Cotswold Hills. The enquiry will open on December 2. As we reported last week, the Worcestershire County Council has decided to add its protest to Gloucester's against the construction of this 100 miles of line from Hams Hall to Melksham, and, judging from reports, it seems likely that Warwickshire and Wiltshire will also object.

Monmouthshire

Rogerstone Parish Council has again emphasised that it is strongly opposed to the B.E.A.'s proposal to construct a generating station at Rogerstone. At the Council Meeting it was stated that the Magor and St. Mellons Rural Council had rescinded their earlier decision to object, as we reported last week.

North of Scotland

A start is shortly to be made on the Moray Distribution scheme by the North of Scotland Hydro Electric Board. The scheme will cover an area of approximately 400 square miles comprising most of Morayshire and a section of Mid-Banffshire in the vicinity of Dufftown and Aberlour. To provide supplies in this area it is estimated that 250 miles of h.t. line and 150 miles of l.v. line will be erected. The Board hopes to place a contract for this work before the end of the year. When this has been done the Board's representatives will contact prospective consumers in order that development shall proceed rapidly. Each consumer is to be asked to guarantee a minimum revenue to the Board calculated at £3 per habitable room plus £3 per 1,000 sq ft of steading area in the case of farms, for a period of at least 7 years. The scheme is expected to be completed in five years.

North Wales

The proposed hydro-electric scheme by the B.E.A. at Llyn Cau on the Cader Idris mountain range would cause "frightful damage to one of the most beautiful parts of the Snowdonia National Park" was the comment of Sir Patrick Abercrombie, consultant to the Snowdonia National Park joint advisory committee at a meeting at Dolgelley last Thursday.

S.E. Scotland

The South-East Scotland Electricity Board has been recommended by its Consultative Council to spend £164,000 in rural development in 1954-55 in the Southern sub-area, which consists of Roxburgh, Selkirkshire, Berwickshire, a large part of Peebleshire and part of Midlothian.

Seisdon

Following a meeting of the Housing Committee with representatives of the Midlands Electricity Board, the latter has agreed to waive, subject to certain conditions, its demand for a contribution of £2,000 towards the cost of providing a supply to 138 houses being erected by the Seisdon Council. The Board had pointed out to the Council that some other councils in the area had purchased and installed electric cookers in houses to provide an economic revenue for the Board's capital outlay.

Sutherland

More than half the premises in the county of Sutherland were now being supplied with electricity by the North of Scotland Hydro-Electric Board, Sir Hugh Mackenzie, deputy chairman of the board, stated recently. On April 1, 1948, a total of 1,023 consumers were being supplied in Sutherland. Now there were 2,451 consumers. Contracts placed would supply a further 1,295 premises and other extensions would increase the population served to about 8,763. The board have in commission in the county about 115 miles of o.h. line and on completion of the contract a total of 770 miles will be in use.

LIGHTING SCHEMES

Finchley.—T.C. is recommended to approve a scheme for sodium lighting improvements in Woodhouse Road, Granville Road and Nether Street, at a cost of £3,160.

Garstang (Lancs.).—The R.D.C. has approved a scheme to improve street lighting, estimated to cost £8,275.

Lancing.—The parish council's application to borrow £6,366 for improving and extending street lighting has been approved by the Ministry of Housing and Local Government.

Mountain Ash.—The U.D.C. is seeking M.O.T. approval to the borrowing of £21,000 for expenditure on redesigning street lighting on the main traffic routes in the area.

Company Activities . . .

Calcutta Tramways

An admirably clear survey of events of the last 18 months and the problems which now confront this company was given by Mr. D. E. Webb, the chairman, at this meeting last week. It is his view that the strike of employees was brought about by a few trouble-makers who had used their power for political ends and with a view to creating trouble and embarrassing the Government. He hopes that before long the findings of the Fares Tribunal will be revealed, enabling the company to look forward to a period of settled trading. In the meantime it is of paramount importance to re-establish its liquid resources.

Dictograph Telephones Ltd.

For the year ended August 31 last, the consolidated group profit is £62,237 *(£58,731)* after charging taxation, depreciation, etc. The final Ordinary dividend is 10%, making a total of 20% for the year on the larger capacity. These dividends absorb £33,000 *(£26,250)*.

Fisher and Ludlow, Ltd.

This concern, which is involved in the manufacture of refrigerators and washing machines in addition to its car body activities, reports a group net profit of £361,058 for the year ended March 31 last. The corresponding figure for the previous year was £342,169. The year's 22½% dividend was paid last September.

Plessey Co. Ltd.

For the year ended June 30 last the group net profit, after depreciation, taxation, etc., is £327,036, as against £234,190 for the previous period the final Ordinary dividend of 17½% raises the total distribution for the year to 30% —5% more than previously.

Hankow Light and Power Co.

Operations during the year ended March 31 last resulted in a further loss of £344, compared with a loss of £330 in the previous year. This brings the debit balance carried forward to £6,459. The directors state that there has been no change in the situation since the last annual meeting. It is still impossible to obtain any information as to conditions in Hankow.

Perak River Hydro Electric Power Co.

Being closely associated with the tin mining industry, the fortunes of this company are largely reflected in the activities of that industry. Thus the sharp fall in tin prices earlier this year resulted in short working by certain mines, and the closing down of some Chinese gravel-pump mines which had been operating on narrow profit margins. But there remains a considerable number of potential consumers not connected to the company's system, and the subsidiary concern, Kinta Electrical Distribution Co., which supplies 51 towns and villages, is steadily expanding. Mr. Hugh G. Balfour, the chairman, reports that sabotage of transmission lines virtually ceased during the year under review, there being only one incident, compared with 26 in the previous year. While the tin industry has received payment of up to 90% of its assessed war damage claims, this company has as yet only had 50% of its claim met. Several projects are at present under consideration for augmenting the generating capacity of the undertaking, and capital and renewal commitments are therefore likely to increase in the immediate future, he states.

Year to July 31	£ Gross Revenue	£ Net Profit	% on Ord. Earned	% on Ord. Paid	Ord. Price High	Ord. Price Low
1949	827,257	85,863	5	—	14/1	9/6
1950	971,338	147,029	12	—	12/6	7/6
1951	1,138,781	164,201	14	—	14/-	8/3
1952	1,266,709	132,777	11	—	15/-	10/9
1953	1,385,190	159,117	13	6	17/10	14/4

Sun Electrical Co., Ltd.

There is a small increase in the profit for the year ended April 30 last. At £35,145 that figure is £2,088 higher than for the previous year. This figure is struck after charging taxation and including £5,000 *(nil)* tax overprovision. The Ordinary dividend is again 15%.

Tube Investments Ltd.

The Electrical Division of this group has made headway, and reports improved sales and income for the year ended July 31, but it is still heavy going for the domestic electrical industry, Mr. Ivan A. R. Stedeford, the chairman, states. The Aluminium Division had a difficult year, however, a reduction in output, coupled with lower selling prices and some rising costs, resulting in a substantial trading loss. But the continuous wide rolling mill being equipped at Resolven, will only take one more year to complete, and then the savings in costs should result in increased business. The Steel Tube Division had another satisfactory year's trading, but the serious deficiency in Britain's capacity for producing tube steels remains virtually unchanged.

Ultra Electric (Holdings) Ltd.

Approximately 93% of the 180,000 5s. shares offered to shareholders at 5s. 6d. each have been accepted. Excess applications totalled more than 500,000 shares.

Dividends Declared

Aberdare Cables Africa Ltd.—Dividend of 15% *(same)*.

East African Power and Lighting Co.—Interim of 3% *(same)*.

Hackbridge and Hewittic Electric Co. Ltd.—Interim of 5% *(same)*.

Pye (Ireland) Ltd.—Interim of 2½% *(same)*.

Revo Electric Co. Ltd.—Interim of 3½% *(10%)* but on capital increased by a 200% scrip issue.

Telephone Manufacturing Co.—Interim 2½%.

Commercial Information

CONTRACTS OPEN

HOME

Dates given are the final for receipt of tenders, unless otherwise stated.

20 Nov.—Barking T.C. Street lighting.—See Nov. 12 issue.

20 Nov.—Co. Kildare. Pumping plant in Ballytore water scheme.—See Oct. 8 issue.

20 Nov.—Dublin. Supplies for Gt. Northern Railways.—See Nov. 5 issue.

20 Nov.—Londonderry. Installation at Ballyrashane school.—See Oct. 22 issue.

20 Nov.—Londonderry. Installation at Tobermore school.—See Nov. 12 issue.

20 Nov.—Luton T.C. Installation at Luton airport.—See Nov. 12 issue.

23 Nov.—Blofield and Flegg (Nfk.) R.D.C. Vertical spindle borehole type pumps.—See Oct. 15 issue.

23 Nov.—Bradford T.C. Electrical installation in Greengates primary school. City Architect's Office, Town Hall.

23 Nov.—Northern Ireland. Installation at Royal Victoria Hospital.—See Nov. 12 issue.

23 Nov.—Wisbech T.C. Street lighting.—See Oct. 29 issue.

24 Nov.—Chelmsford T.C. Supply, erection, and wiring of 172 street lamps on Westlands, Woodhall, Andrews Place, and Widford estates. Borough Engineer and Surveyor, Municipal Offices, Duke St. Deposit £2 2s.

24 Nov. — Staines (Middx.) U.D.C. Supply and erection of 72 steel columns and brackets and erection and wiring of lanterns, etc.; and supply of lanterns and fittings for mercury vapour street lighting in Group A along A.30. A. Hawley, engineer and surveyor, Shortwood House, 240 London Rd. Deposit £2 2s.

25 Nov.—Clutton R.D.C. Installation in 10 houses at Hinton Blewett.—See Nov. 5 issue.

25 Nov.—Dublin. Installation at Portrane Mental Hospital.—See Nov. 5 issue.

25 Nov.—Lanarkshire. Electrical work in erection of primary school at Townhead, Coatbridge. Applications by above date to W. C. Brownlie, County Clerk, P.O. Box 1, Lanarkshire House, 191 Ingram St., Glasgow.

25 Nov.—Liverpool T.C. Electrical installation at Matthew Arnold primary school, Dingle Lane. City Engineer and Surveyor, Municipal Buildings.

25 Nov.—Wandsworth B.C. Supply of cable.—Advertised Nov. 12 issue.

27 Nov.—Farnham U.D.C. Lighting pedestrian crossings.—See Nov. 12 issue.

27 Nov.—Gosforth U.D.C. Supply of 70 140 W sodium discharge lamps, lanterns and equipment; 60 150 W tungsten filament lamps, lanterns and equipment; 130 time switches; 60 12½ ft cast-iron columns; and 70 extension brackets; for street lighting. C. Wild, Engineer and Surveyor, Council Chambers.

27 Nov.—Merthyr and Aberdare. Rewiring of Lord Buckland block at Merthyr General Hospital. Group secretary is I. Davies, St. Tydfil's Hospital.

27 Nov.—N. Ireland. Installation at Whiteabbey Hospital, Antrim.—See Nov. 5 issue.

27 Nov.—Paignton U.D.C. Supply of two electrically driven vertical spindle unchokeable sewage pumps, control panel, etc. Engineer and Surveyor, Municipal Offices, Oldway, Paignton.

30 Nov.—Bournemouth T.C. Equipment for sub-stations.—Advertised in Nov. 5 issue.

30 Nov.—Dover T.C. Two street lighting contracts.—Both advertised in Nov. 12 issue.

30 Nov.—Dundee T.C. Supply of (a) poles and brackets for group B street lighting; (b) lanterns for groups B and A lighting; and (c) P.B.J. cable. Public Lighting Engineer, 46 Dens Rd.

30 Nov.—N. Ireland. Electrical installation in 102 houses at Omagh, 59 at Dromore, and 22 at Killyleagh. N.I. Housing Trust, 12 Hope St., Belfast.

30 Nov.—St. Helens T.C. Street lighting.—Advertised in Nov. 12 issue.

30 Nov.—Tottenham B.C. Supply of lamps during 1954-55.—See Oct. 15 issue.

1 Dec.—Hull. B Group Hospital Management Committee requires supply of electric lamps and cables. Group Secretary, De la Pole Hospital, Willerby.

1 Dec.—N. Ireland. Electrical installation in 50 dwellings at Donaghadee. N.I. Housing Trust, 12 Hope St., Belfast. Deposit 10s.

1 Dec.—Torpoint U.D.C. Repair, maintenance and replacement of all domestic electrical installations and equipment in council houses. Council's Surveyor, County Offices, York Rd.

2 Dec.—Newcastle-on-Tyne T.C. Electrical installations in 72 flats in Group 3 and 144 flats in Group 5 on Kenton North estate. City Architect, 18 Cloth Market.

3 Dec.—Co. Down. Installation at Castlewellan intermediate school.—See Nov. 12 issue.

4 Dec.—Belfast T.C. Crane, switchgear, etc.—Advertised in Oct. 15 issue.

4 Dec.—Debenham (Suff.) R.D.C. Pumping plant.—See Nov. 12 issue.

4 Dec.—Romford T.C. Electrical installations in 60 flats and 74 houses on Heaton Grange site. Borough Engineer and Surveyor, Town Hall. Deposit £2 2s.

5 Dec.—Longbenton U.D.C. Installation in 22 houses on Kelvin Park estate.—See Nov. 12 issue.

7 Dec.—Aberdeen T.C. Installation in offices, workshops, etc., at Cattofield Place.—See Nov. 12 issue.

7 Dec.—Newport (Salop) U.D.C. Supply and installation of concrete columns, and of 48 140 W sodium lighting units along trunk road A41. W. P. Goldsbrough, Clerk of Council, Council Offices. Deposit £2 2s.

7 Dec.—Salford T.C. Call system in 4 bathing establishments.—Advertised in Nov. 12 issue.

7 Dec.—Scunthorpe T.C. Supply of concrete columns, mercury discharge lanterns, and auxiliary gear, plus erection and wiring of 107 columns. Borough Surveyor, C. Cooper, Comforts

Ave. Deposit £2 2s.—Advertised in this issue.

7 Dec.—Swansea T.C. Electrical installation in 129 houses on West Cross estate. Applications by above date to Borough Architect, The Guildhall. Deposit £2.—Advertised in this issue.

8 Dec.—Sedgley U.D.C. Provision and erection of 36 concrete columns, with 250 W mercury vapour lighting equipment in Class A along four roads. W. M. Jones, Engineer and Surveyor, The Limes, Dudley Rd.

11 Dec.—Belfast T.C. Boiler units for Power Station West.—Advertised in Oct. 1 issue.

11 Dec.—Belfast T.C. Exhaust piping with valves and electrical controls for Power Station West.—Advertised in Oct. 15 issue.

12 Dec.—Newmarket U.D.C. Supply and installation of 40 fluorescent units, control gear, lamps and/or steel columns in Group A along High St. F. B. Waterfall, Engineer and Surveyor, Council Offices, Severals House. Deposit £1 1s.

12 Dec.—Port Talbot T.C. Electrical installation in about 520 houses at Cwmavon and 290 in Baglan. Borough Engineer and Surveyor, Municipal Buildings.—Advertised in this issue.

14. Dec.—Barnsley T.C. Supply of street lighting standards and equipment for Athesley North estate. Borough Engineer, Town Hall.—Advertised in this issue.

16 Dec. — Newcastle - on - Tyne T.C. Electrical installation in 21 flats in Cheltenham Terr. and Guildhall Pl. City Architect, 18 Cloth Market.

16 Dec. — Newcastle - on - Tyne T.C. Installation of lighting in total of 965 existing houses in seven sections. City Architect, 18 Cloth Market.

18 Dec.—Belfast T.C. Turbo-alternators, feed heating and condensing plants sets, generator transformers, and circulating water pumps for Power Station West.—Advertised in Oct. 15 issue.

18 Dec.—Belfast T.C. 110 kV oil pressure or gas type, and 33 kV main cables, auxiliary cables and accessories.—Advertised in Nov. 5 issue.

18 Dec.—Windsor T.C. Installation in 36 flats in Dedworth Rd.—See Nov. 12 issue.

4 Jan.—Lancaster T.C. Pumping plants for Lune St., Scale Hall, and Willow Lane pumping stations.—See Nov. 5 issue.

OVERSEAS

*Details of items marked * may be obtained on application to the Board of Trade, Lacon House, Theobalds Road, W.C.1, quoting reference.*

4 Dec.—New Zealand. Auckland Electric Power Board require supply of 50,000 yds .075 sq. in. and 10,000 yds .0225 sq. in. weatherproof braided aerial cable for 400 V a.c. overhead lines. Chairman of Board, Queen St., Auckland. Deposit £100. B.o.T. (Ref.: ESB 8729/53)*.

10 Dec.—U.S.A. Supply of three power circuit-breakers and spares for Case Grande substation, Davis Dam Project, Arizona. (Tender No. D.S. 4070.) Dept. of Interior, Bureau of Reclamation, Building 53, Denver Federal Center, Denver, Colorado. B.o.T. (Ref.: ESB 9125/53)*.

6 Jan.—South Africa. Tenders invited (contract 125) for eighteen 600 A and one 2,400 A 6·6 double busbar 500 MVA circuit-breakers, and eleven 400 A 6·6 kV single busbar 250 MVA circuit-breakers for City of Johannesburg. Stores and Buying Branch, Room 208, Panama Hse., 200 Commissioner St. B.o.T. (Ref.: ESB 8107/53)*.

2 Feb.—New Zealand. Supply of 23 33 kV 350, 500 and 750 MVA 3-phase oil circuit-breakers and accessories for operation on a 33 kV 3-phase 50 c/s system in which neutral point is solidly earthed. Tender No. 248. State Hydro-electric Dept., Wellington. B.o.T. (Ref.: ESB 6747/53)*.

2 Feb.—New Zealand. Supply of fourteen 110 kV 3-phase air break switches for Otahuhu substation. Contract 246. State Hydro-Electric Dept., Auckland District. Documents available from N.Z. Govt. offices in London.

16 Feb.—New Zealand. Supply of two 220 kV 3-phase airbreak switches for normal current of 600 amps. min. and 5 secs. duration current of 30,000 amps. Contract 250. State Hydro-electric Dept., Wellington. B.o.T. Ref.: ESB 8273/53)*.

CONTRACTS PLACED

Barking T.C. Installation of electricity on Thames View estate, London Electricity Board.

Birmingham T.C. Electrical work in Garretts Green school, Electrical Installations, Ltd.; in Brownmead junior school, Mid-

Your Queries — Answered

"Electross" towel rails, makers of? N.S.—"Lectross" towel rails were made by John A. Grey and Partners, Ltd., a firm which went out of business about three years ago. Spares, etc., can be supplied by E.P.E. Ltd., 152/3 Fleet St., E.C.4. (24627)

"Finmere" lighting fittings, makers of? E.B.—These were made by the concern which is now the Harcourts Division, Edison Swan Electric Co., Ltd., 155 Charing Cross Rd., W.C.2. (24645)

Battery-operated clocks, makers of? H.E.—Anglo Time Corpn. Ltd., Brockhouse Mills, Blackburn. (24669)

Low-voltage blankets supplied complete with transformer, makers of? F.R.—Windak Ltd., Woodside, Poynton, Ches. (24680)

"R and L" lampholders, makers of? A.L.—Rainsford and Lynes Ltd., 113/127 Emily St., Birmingham 12. (24693)

"Excel" products spares, address for? J.E.—Selex Electric Co., Ltd., Yardley Rd., Kirby Trading Estate, near Liverpool. (24706)

"Junction" irons, makers of? S.W.—G. P. Chamberlain and Co., Ltd., Junction Works, Carmichael Rd., S.E.25. (24714)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

Magnetic valves—small type suitable for controlling flow of fuel oil, makers of? G.H. (24729)

lands Electricity Board; in Aldridge Rd. Multitype school, Lee Beesley and Co., Ltd.; and in Norton grammar school, T. Glover (Electrical), Ltd.

Edmonton T.C. Electrical installation on Flamstead End estate, £1,394; Templeman's Nursery estate, £1,028; and Alcazar and Elms Development, £931; Holmes and Larkinson.

Hertford T.C Rewiring of 47 houses on Bengeo estate, Eastern Electricity Board, £1,175.

Hull T.C. Electrical work in extension to Central Telephone Exchange, Booker and Tarran, Ltd. Same in 75 dwellings in Bean St., A. Lee.

Lewisham B.C. Supply of 300 semi-flush electric control units, Mantel Metalworks, Ltd., £1,582.

London. Electrical installation at Bellenden primary school, Alex. Hawkins and Sons, Ltd., £2,886; same at Riversdale primary school, Johnson, Smith and Co., Ltd., £3,297; also at Downham estate extension, London Electricity Board, £7,935; and at Risinghill primary school, Powerlite Electrical Installations, Ltd., £2,614.

Newcastle-on-Tyne T.C. Supply of 92 flashing beacons, Revo Electric Co., Ltd., £1,332. Also, electrical installation in 1,284 flats on Longbenton estate, Tanjon (Newcastle), Ltd. Supply of four electric travelling cranes for Quayside, Cowans Sheldon and Co., Ltd., £63,000.

Nuneaton T.C. Electrical work at Camp Hill school, Electrical Equipment Co. (Leicester), Ltd., £1,730.

Sheffield T.C. Electrical installation in Beaver Hill and Hurlfield schools, Yorkshire Electricity Board, £6,986 and £9,622.

PRICE OF CABLE METALS AND OTHER MATERIALS
(Official prices at Tuesday, Nov. 17)

	£ per ton	Weekly change
COPPER, standard class A (settlement)	238	—
,, (3 months)	224½	+3½
LEAD, refined pig, min. 99·97% purity (cash)	93¾	+¼
,, (3 months)	90½	+¼
Tin, refined, min. 99·75% purity (settlement)	630	+15
,, (3 months)	620	+12½
ALUMINIUM, ingots 99-99·5%	150 0 0	—
ZINC, virgin, min. 98% purity (cash) ...	75½	—
,, (3 months)	74¾	+¼
RUBBER No. 1, RSS. spot ...(per lb.)	16½d.	−¼
,, c.i.f. basis, ports. Jan. (per lb.)...	16½d.	−¼
ARMOURING:		
Galv. Steel Wire (0·104 in.)	50 10 0	—
Mild Steel Tape (0·014 in.)	40 0 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Central Refrigeration Ltd. Meeting of creditors will take place at Winchester House (Room 11), Old Broad St., E.C.2, on Nov. 24 at 2.30 p.m.

Madeira Electric Lighting Co. Ltd. Meeting of members will be held at Magnet House, Kingsway, W.C.2, on Dec. 14 at 12 noon, to receive liquidator's report.

Voluntary Liquidation

P. J. Stephens Ltd. At statutory meeting of creditors statement of affairs showed liabilities £4,616, of which £1,027 was due to trade creditors; £120 accrued charges; and £3,468 to loan creditors. Assets estimated to realise £529 and after allowing £98 for rent and rates there were net assets of £430, or a deficiency of £4,186. During discussion, Mr. P. J. Stephens intimated he would waive loan claim of £1,668 in favour of creditors generally, provided affairs were dealt with under voluntary liquidation. Creditors passed resolution confirming voluntary liquidation with Mr. N. W. Osborne, C.A., of Rushton, Osborne and Co., 11/12 Finsbury Sq., E.C.2, as liquidator, with a committee of inspection.

BANKRUPTCY ACTS

Receiving Order

Swindon. Fred Kirk, electrical engineer, trading at 8 Railway St., Pocklington. Date of receiving order, Nov. 6.

First Meetings

Coventry. Edward F. C. Ward, trading as F. C. Ward, heating and ventilating engineer at 23 Eaton Rd., Coventry. First meeting at Official Receiver's Office, Somerset House, 37 Temple St., Birmingham, tomorrow (Fri.) at 11.45 a.m., and public examination at County Hall, Coventry, on Jan. 25 at 2.30 p.m. Receiving order dated Nov. 5.

London. Norman E. Stevens, trading as Southern Radio Service at 224 Rye Lane, Peckham, S.E.15. First meeting at Bankruptcy Bldgs., Carey St., W.C.2, today (Thurs.) at 2.30 p.m., and public examination will be at same address, on Jan. 15 at 11 a.m. Date of receiving order, Nov. 4.

Dividends

Huddersfield. Norman R. Kenyon, electrical and heating engineer, trading as Joe Kenyon and Son at 42 Station Rd., Holmfirth, and Birdweld Works, Smithy Place, Brockholes. First dividends of 6s. in £ payable at offices of H. V. Wood and Co., Bank Chambers, Market St., Huddersfield, on Nov. 30.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller

Fusarc. 705,061. Class 7. Welding machines. 703,711. Class 9. Electrodes, etc. Fusarc Ltd., Bridgewater House, Cleveland Row, St. James, S.W.1.

Handette. B719,844. Class 9. Vacuum cleaners and floor polishing machines. Electrix Ltd., Sterling Works, Dagenham.

Hilger. 700,800. Class 10. X-ray apparatus. Hilger and Watts, Ltd., 48 Addington Sq., S.E.5.

Megavox. 720,563. Class 9. Sound recording and reproducing apparatus, etc. Trix Electrical Co., Ltd., 1/5 Maple Place, W.1.

Nelo. 719,944. Class 11. Electric lamps. Electromotives (Croydon) Ltd., Fountain Works, Fountain Rd., Thornton Heath.

Prestofreeze. B721,536. Class 11. Refrigerating machines, etc. Pressed Steel Co., Ltd., Cowley, Oxford.

Square Path. 721,285. Class 7. Alternators. Brush Electrical Eng. Ltd., Duke Court, Duke St., S.W.1.

BUSINESS PROSPECTS

HOME

Alnwick R.D.C. Shops are to be built at Shilbottle. Council architects are Reavell and Cahill, Lloyds Bank Chambers.

Barnsley T.C. Erection of Athersley North secondary school. H. A. Redburn, Director of Education, Town Hall.

Belfast T.C. Construction of 36 flats on Clara Park estate. Housing Architect's Dept., 94 Chichester St.

Billingham U.D.C. Construction of 109 houses in four groups. Engineer and Surveyor, Council Offices, Haverton Hill, Billingham.

Bristol. Architects for erection of Redland Park Congregational church are Oatley and Brentnall, 12 St. George St.

Buckinghamshire. Erection of junior and infants' school at Langley. County Architect, County Offices, Aylesbury.

Camberwell B.C. G. D. Walford and Partners, 7-9 St. James's St., S.W.1, will probably be quantity surveyors for erection of 90 flats on various sites.

Carmarthen. Approval given to erection of unit for sick mental patients at Carmarthen Mental Hospital. Estimated cost, £60,000.

Castletown (I.o.M.). Scheme being prepared for construction of 34 houses at Janet's Corner.

Croydon T.C. Scheme proposed for provision of flashing beacons on pedestrian crossing at estimated cost of £7,383. Also erection of 39 flats in Quadrant Rd. Borough Engineer, Town Hall.

Doncaster T.C. Work expected to start in spring on new technical high school for boys in Armthorpe Rd.

Dover. Rewiring of infectious diseases hospital costing about £1,460 is before S.E. Metropolitan Hospital Board.

Durham T.C. 237 acres of land at Low Carr House farm to be acquired for erection of houses.

Erith T.C. Erection of 30 flats in three blocks at Belvedere. J. H. Clayton, Borough Engineer and Surveyor, Town Hall.

Gateshead T.C. Consideration to be given to erection of proposed Oakfield primary school.

Glasgow T.C. Erection of primary school at Cranhill. Architectural and Planning Dept., 20 Trongate.

Greenwich. S.E. Metropolitan Hospital Board is considering rewiring Miller General Hospital. Cost estimated at £2,515.

Hackney B.C. It is proposed to erect 41 dwellings on Chailey Rd. site, 20 on Cecilia Rd. site, and 6 flats on Oswald St. site.

Longbenton U.D.C. Scheme in hand for installing electricity in gaslit houses. First stage will involve 460 houses at Forest Hall. Houses at Holystone, Palmersville and Benton will be dealt with later.

Louth T.C. Erection of 72 dwellings, in four contracts, on Eastfield Rd. estate. Architects are Vallance and Westwick, White Hart Chambers, Mansfield.

Milford Haven. Approval received for block of flats off Pill Road.

Newport (I.o.W). T.C. Layout plans approved for bus station in South Street.

North Riding. First instalment of £400,000 scheme for college of further education at Redcar to be included in next year's building programme. Collins, Melville, Ward and Partners, 15 Manchester Sq., London W.1, are architects.

Nuneaton T.C. Plans in hand for erection of 155 houses in Queen Elizabeth and Ludford Rds. and of 24 houses in Dorlecote Rd.

Runcorn U.D.C. Scheme in hand for erection of 82 dwellings on Penn Lane estate and 37 on Green lands estate.

Smethwick T.C. Sketch plans approved for extensions to Holly Lodge girls' school. Estimated cost, £68,500.

Spennymoor U.D.C. Layout plans approved for Middlestone Moor estate providing for over 500 houses.

Stockton-on-Tees T.C. Erection of 68 houses in Portrack Lane. Borough Architect, 28 The Square.

Stoke Newington B.C. Sites to be purchased in Grazebrook site for 90 flats; in Queen's Drive for 20 flats; and in Manor Rd. for 63 flats.

Stoke-on-Trent T.C. It is proposed to rewire Penkhull Children's Homes at cost of about £1,790. It is recommended that 2,500 dwellings be built next year.

Stratford-on-Avon T.C. Approval sought to erection of 60 houses between Oak Rd. and New St., Tillington.

Tynemouth T.C. Further programme involving construction of about 800 houses during next five years has been approved.

Wales. New operating theatre and X-ray dept. to be provided at Llanelly General Hospital, and also an instalment of blood transfusion centre at Rhydlafer, nr. Cardiff. Cost estimated at £54,369.

Warwickshire. A £1¼ million two-year building programme has been approved.

Wellington (Salop) U.D.C. Erection of 169 dwellings on Park Walls estate. Engineer and Surveyor, Council Chambers, 14 Walker Street.

West Hartlepool T.C. It is proposed to build new £74,000 fire station.

Wigan T.C. Application to be made to borrow £62,348 for erection of shops and flats on Worsley Hall estate.

Willesden T.C. It is proposed to erect a 10-storey, a 4-storey, and a 6-storey block providing for 78 dwellings on Frontenac site.

Worcester T.C. Three-phase scheme being considered for extensions to Guildhall, estimated to cost £180,000; Council recommended to approve rewiring and provision of emergency lighting system.

OVERSEAS

Canada. Enquiry received concerning electrical battery-driven vehicles known as Electric Caddie. They are small 3-wheeled vehicles, light, driven by 2-h.p. battery d.c. motor, and carry two persons plus clubs round golf courses. Interested firms should write to Mr. Myron Soloman, 4892 Queensland Rd., Vancouver 8. U.S. price of similar vehicles is $1,000.

Lebanon. New de luxe hotel with 170 rooms to be built on sea front at Beirut. Manufacturers interested in offering products for fitting out this hotel should write to Mr. G. Harvey, British Vice-Consulate, Rue Tell, Tripoli, Lebanon.

Venezuela. Representation of U.K. manufacturers of office lighting fixtures sought by Mr. Maurice Brunner, Apartado 2973, Caracas.

TRADE NOTES

Change of Name. To reflect the broadened activities of the company, Smith's Electric Vehicles, Ltd., Team Valley, Gateshead-on-Tyne, have decided to change their title to Smith's Delivery Vehicles, Ltd. The management and staff remain unchanged.

Distributing Agents. The Tubela Engineering Co., Ltd., have appointed concerns as the sole distributing agencies for their products in Canada and Latin America. For Canada the agents are F. J. Edwards (Canada), Ltd., 16 Watsons Drive, P.O. Box 72, Toronto 18, and for Latin America, Rabone Peterson and Co., Ltd., 4 Exeter St., Holloway Head, Birmingham 1.

Beama Contract Price Adjustment Formulae.—*For Electrical Machinery and Equipment.* For purposes of calculating variations in: (*a*) "Rates of Pay"—the rate of pay for adult male labour at November 14 1953, shall be deemed to be 141s. 6d.; (*b*) "Cost of Material"—the index figure for materials used in the Electrical Machinery Industry published in the Board of Trade Journal on November 14, 1953, is 153·2.

For Turbo-Generating and Allied Plant. For purposes of calculating variations in: (*a*) "Rates of Pay"—the rate of pay for adult male labour at November 14, 1953, shall be deemed to be 141s. 6d.; (*b*) "Cost of Material"—the index figures published in the Board of Trade Journal on November 14, 1953, are: Materials used in Mechanical Engineering Industries—144·9; "Blast Furnaces and Iron and Steel Melting and Rolling (40 and 41)"—144·2. The price of brass condenser tubes, ¾in. o/d, 18 s.w.g. published in *The Metal Bulletin* on November 13, 1953, is 3s. 7¾d. per lb.

For outstanding Contracts covered by the B.O.T. Intermediate Products Index. For purposes of calculating variations in: (*a*) "Rates of Pay"—the rate of pay for adult male labour at November 14, 1953, shall be deemed to be 141s. 6d.; (*b*) "Cost of Material"—the index figure for Intermediate Products published in the Board of Trade Journal on November 14, 1953, is 352·9.

Representative. London representative for Burco, Ltd., Mr. G. S. Hones, 40 Tonbridge Crescent, Kenton, Middlesex, is now on the telephone. His number is Wordsworth 9326.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London, W.C.2.

Amos (Electronics) Ltd., Ty Gwyn, Mentone Av., Aspley Guise, Bletchley. Cap.: £100. Dirs.: A. P. G. Amos and Dorothy C. Amos.

John Andrew (Wholesale Electricals) Ltd., 86 Shaftesbury Av., W.1. Cap.: £2,000. Dirs.: J. A. Fountaine and Mrs. E. J. Fountaine.

H. D. Barlow and Co. Ltd., 27, Finsbury Sq., E.C.2. Mechanical, electrical, radio, television, scientific, chemical, aeronautical, astronomical, marine, automobile and/or general engineers, etc. Cap.: £1,000. Dirs. F. Cracknell.

John Buzzard Ltd., 1/2 Church Lane, Banbury, Oxon. Manufacturers of and dealers in electrical and mechanical apparatus and accessories, and in particular wireless and radio sets, etc. Cap.: £3,000. Dirs.: J. D. Buzzard and Mrs. M. A. Buzzard.

Deepfreeze (Blackpool) Ltd., 26 Cookson St., Blackpool. Manufacturers of and dealers in refrigerators and cold storage plant, etc. Cap.: £1,000. Dirs.: K. W. Bridge and P. A. Taylor.

Deep Freeze and Cold Storage (Northants) Ltd., 56 Guildhall Rd., Northenden. Cap.: £14,000 Permanent Gov. Dir.: T. R. Mayes.

E.M.S. Electrical Products Ltd. 28/32 The Butts, Coventry. Manufacturers of and dealers in electrical goods, etc. Cap.: £100. Dirs.: J. M. Hollander and G. Lockwood.

D.b. Anti-static Aerials Ltd., Haymarket House, 31/2 Haymarket, S.W.1. Manufacturers of and dealers in electrical goods etc. Cap.: £100. Dirs.: C. B. Bovill, D. I. Lenchner and A. D. Besser.

H. N. J. Engineering Facilities Ltd., 37 Brown St. Manchester 2. General, motor, mechanical and electrical engineers and contractors, etc. Cap.: £1,000. Dirs.: A. Hitner and Mrs. D. Hitner.

Gillone Electric Ltd., Rockstone Works, Rosemary Lane, Camberley, Surrey. Electrical contractors, manufacturers of and dealers in television, wireless and electrical components, etc. Cap.: £1,000. Dirs.: G. D. Gilbert and A. L. Leeson.

Rahvey Ltd. Electrical, radio and general engineers, etc. Cap.: £1,000. Dirs.: to be appointed by subs. Subs.: L. A. Clark, 12 Buckingham St., W.C.2, and R. H. Manwaring, 42 Mixes Hill Rd., Luton.

R.I.C. Components Ltd., 1a St. Mary's Rd., Harlesden, N.W.10. Electronic electrical equipment specialists, etc. Cap.: £100. Dirs.: to be appointed by subs. Subs.: P. R. Moss and E. H. Stoner.

Servo & Electronic Sales Ltd., 1 Hopton Parade, Streatham High Rd., S.W.16. Manufacturers of and dealers in electrical and mechanical equipment and accessories, particularly for servo control purposes, etc. Cap.: £500. Dirs.: E. J. Egan and Charlotte W. Egan.

Spedding and Harrington Ltd. Electrical and mechanical contractors and engineers, etc. Cap.: £100. Dirs.: F. Harrington, 96 Morthen Rd., Wickersley, nr. Rotherham and J. W. Spedding, 23 Audley Rd., W.5.

Structural and Chemical Developments, Ltd. Consulting, chemical, structural, electrical and mechanical engineers, etc. Cap.: £1,000. Dirs.: E. C. Willoughby, 15 Russell Rd., Mitcham, Surrey, and J. W. Gardiner, 78 Greyswood St., Streatham, S.W.16.

Stuart and Thompson (London) Ltd., Raleigh Works, Raleigh, Barnstaple, Devon. Mechanical and electrical engineers, electricians, etc. Cap.: £1,000. Dirs.: L. S. Bagg, J. T. Triggs and G. C. Fairbanks.

R. L. Timms (T.V.) Ltd., 6 Castillian St., Northampton. Wireless, electrical, television, public address and recording engineers, etc. Cap.: £5,000. Dirs.: R. L. Timms and Phyllis M. Timms.

Tombar Trading Co. Ltd. Coventry House, 3 South Place, Moorgate, E.C.2. Importers, exporters, wholesalers, merchants, agents and dealers in merchandise of all kinds, including electrical goods, etc. Cap.: £100. Dir.: F. Barton.

J. W. Transport Ltd., Bristol Chambers, 19/20 Holborn Viaduct, E.C.1. Motor dealers, motor, mechanical and electrical engineers, haulage contractors, etc. Cap.: £100. Dir. J. Wilson.

Wallace and Co. (Birmingham) Ltd. Wholesale and retail dealers in wireless, telephonic

and television sets and all electrical apparatus, etc. Cap.: £6,000. Dirs.: to be appointed by the subscribers. Subs.: A. R. Smith, Osmotherley, Blackwell, Bromsgrove, Worcs. and M. J. Tollett, 22 Brooklands Rd., Hall Green, Birmingham (clk).

Wilkinson Processes (High Frequency), Ltd. Grand Bldgs., Trafalgar Sq., W.C.2. To apply for or acquire any trade secrets, processes, inventions, etc., and mechanical, electrical, constructional and scientific engineers, etc. Cap.: £100. Dirs.: to be appointed by subs. Subs.: H. J. Friend, 137 Farmer Rd., Leyton, E. and H. E. Smith, 27 Inglewood Rd., N.W.6.

Wyeland Jones (Gloucester) Ltd., 23 Nine Elms Rd., Longlevens, Gloucester. Electric, radio, lighting, telephone, mechanical and general engineers, etc. Cap.: £500. Dirs.: W. B. Jones, A. I. H. Coates, and A. K. Priday.

Tube Extrusions Ltd., 69 Wigmore St., W.1. Manufacturers and fabricators of plastic substances, including tubes, conduits, etc. Cap.: £100. Dir.: M. Gordon.

Turner and Booth (Rentals) Ltd., 36 Stanley St., Southport. Electrical, wireless, television and mechanical engineers, etc. Cap.: £100. Dirs.: E. W. Turner and Mrs. B. H. Turner.

Waddington's Electrical Services Ltd., 169 Burnley Rd., Padiham, Lancs. To take over business of electrician, wireless and television engineer, agent and dealer carried on at Padiham, Lancs., by Wm. W. Waddington. Cap.: £5,000. Dirs.: W. W. Waddington, N. Haworth, M. Tillotson and R. Wood.

MEETINGS TO NOTE

THURSDAY, NOV. 19

A.S.E.E. (Kent). "Electrical Installations in Large Buildings." W. F. Parker. Bridge Cafe, 32 High St., Tonbridge, 8 p.m.

I.E.E. (London Utilisation).—"Wear of Carbon Brushes at High Altitudes." R. F. Sims. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (E. Midlands).—"Electricity in Farm Crop Drying." C. A. Cameron Brown and P. G. Finn-Kelcey. George Hotel, Kettering, 7.30 p.m.

I.E.E. (S. Midland).—"Printed and Potted Electronic Circuits." G. W. A. Dummer and D. L. Johnston. Winter Gardens Restaurant, Malvern, 7.15 p.m.

INCORP. PLANT ENGRS. (Blackburn).—"Electrical Hazards." D. A. Picken. Grosvenor Hotel, 7.30 p.m.

FRIDAY, NOV. 20

INSTN. OF MECHANICAL ENGRS.—Thomas Hawksley lecture on "Relaxation Methods." Sir Richard Southwell. Storey's Gate, S.W.1, 5.30 p.m.

I.E.E. (N. Midland).—Annual dinner, Queen's Hotel, Leeds, 7 p.m.

I.E.E. (N. Staffs).—Annual dance at Crown Hotel, Stone, 8.30 p.m.

MONDAY, NOV. 23

I.E.E. (London Radio).—"Loudspeaker Systems—Trends in Design." Maj. A. E. Falkus. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (N. Eastern).—"Design Features of Certain British Power Stations." S. D. Whetman and A. E. Powell. Neville Hall, Westgate Rd., Newcastle, 6.15 p.m.

I.E.E. (S. Midland Radio).—"Printed and Potted Electronic Circuits." G. W. A. Dummer and D. L. Johnston. James Watt Memorial Inst., Gt. Charles St., Birmingham, 6 p.m.

I.E.E. (Western Utilisation).—"Electricity Distribution in Iron and Steel Works." T. B. Rolls and E. C. Slater. S. Wales Inst. of Engineers, Park Place, Cardiff, 7 p.m.

I.E.S. (Leeds).—"Light and Other Radiations in Crime Investigation." C. H. Edlin. 24 Aire St., 6.15 p.m.

I.E.S. (Leicester).—"Interior Decoration and Lighting." Mrs. D. M. Buckland. Elect. Board, Charles St., 7.30 p.m.

TUESDAY, NOV. 24

I.E.E. (E. Midlands).—"Technique and Development of Automatic Winding in Mine Shafts." B. L. Metcalf and G. Cuttle. (Meeting with Instn. of Mechanical Engrs. and Assoc. of Mining, Electrical and Mechanical Engrs.). Gas Showrooms, Nottingham, 6.30 p.m.

INST. OF FUEL (London).—"National Fuel Policy." Dr. F. M. H. Taylor. Inst. of Mechanical Engrs., Storey's Gate, 5.30 p.m.

I.E.E. (N.W. Measurements).—Discussion on "Problems of Metering Service Assemblies." E. Roscoe. Engineers' Club, Albert Sq., Manchester, 6.15 p.m.

BRIT. INSTN. OF RADIO ENGRS. (W. Midlands).—"Remote Control Devices and Servo-mechanisms." A. E. W. Hibbitt. Wolverhampton Tech. College, Wulfruna St., 7.15 p.m.

COVENTRY ELECTRIC CLUB.—"Importance of Keeping Cool." J. Temple-Hazell.

I.E.S. (London).—"Lighting Applications in New Zealand." J. N. Hull. 2 Savoy Hill, W.C.2, 6 p.m.

A.S.E.E. (Coventry). — "Heating and Ventilating." E. E. Smith. Technical College, 7.15 p.m.

E.P.E.A. (S.W. Tech. Group). "Engineering Administration", B. W. Ricks. Electricity House, Colston Avenue, Bristol, 7.15 p.m.

WEDNESDAY, NOV. 25

I.E.E. (London Supply).—"New Approach to Theory and Operation of Electrostatic Precipitators for Pulverised-Fuel-Fired Boilers." N. Troost. Savoy Place, W.C.2, 5.30 p.m.

I.E.E. (N.W. Radio).—"Design of V.H.F. Mobile Radio Systems." E. P. Fairbairn. Engineers Club, Albert Sq., Manchester, 6.30 p.m.

THURSDAY, NOV. 26

I.E.S. (Nottingham).—Film evening.

INST. OF FUEL (Midland).—"Waste Heat Recovery for Steam Raising." C. Ungoed. James Watt Inst. Birmingham, 6 p.m.

TV SOCIETY.—"Converters for V.H.F. or U.H.F. TV." Cinematograph Exhibitors' Assoc., 164 Shaftesbury Ave., W.C.2, 7 p.m.

A.S.E.E. (Luton). — "Vocational Education in Relation to Supervising Electrical Engineer." W. H. Brooks. George Hotel, George St., 8 p.m.

FRIDAY, NOV. 27

INSTN. OF MECHANICAL ENGRS.—'Fuel Systems and Controls for Marine Gas Turbines." R. F. Darling. Also "Main Propulsion Gas Turbine Set for Oil Tanker 'Auris'." B. E. G. Forsling. Storey's Gate, S.W.1, 5.30 p.m.

I.E.E. (Tees-side).—Annual dinner at Zetland Hotel, Saltburn.

I.E.E. (N. Staffs).—"Technique and Development of Automatic Winding in Mine Shafts." B. L. Metcalf and G. Cuttle. Electricity Showrooms, Stoke, 7 p.m.

I.E.S. (Bath and Bristol).—"Lighting for Outdoor Sports." C. Holden. Elect. Board, Old Bridge St., Bath, 7 p.m.

I.E.S. (Cardiff).—Annual summer dance.

MANCHESTER ASSOC. OF ENGRS.—"Fluid Couplings and Application in Electric Motor and Diesel Engine Driven Equipment." E. C. Farrer. Engineers Club, Albert Sq., 6.45 p.m.

E.P.E.A. (S.E. Div.).—Annual dinner to Executive Council. Connaught Rooms, London, W.C.2, 5.30 p.m.

S. WALES INST. OF ENGRS.—Industrial film evening at the Institute, Park Place, Cardiff, 7 p.m.

SATURDAY, NOV. 28

I.E.E. (N. Lancs).—Dinner-dance at Cliffs Hotel, Blackpool, 6.30 p.m.

EXHIBITION DIARY

Fuel Efficiency.—Being held in Manchester until Nov. 28.

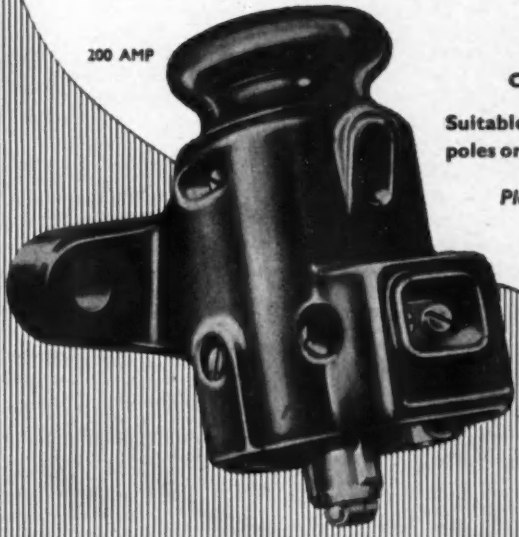
Building.—Open at Olympia, London, until Dec. 2.

Overhead Service Accessories

60 AMP

Two additional Service Fuses for outdoor use are now available, one for maximum continuous working current up to 60 amp and the other up to 200 amp, both being suitable for Cartridge Fuse-links. The design is based on that of the well-known HENLEY 100 amp Outdoor Service Fuses but arranged to accommodate Cartridge Fuse-links.

HENLEY Outdoor Service Fuses



200 AMP

CARTRIDGE TYPE

Suitable for mounting on walls, on poles or with shackle type insulators.

Please ask for Folder 47/A.

W. T. HENLEY'S TELEGRAPH WORKS CO., LTD. 51-53 HATTON GARDEN, LONDON, E.C.1

Cables for Canada.....

but it might have been any other quarter of the globe—for Pirelli-General cables are in use all over the world. Here is some of the 301,000 V oil-filled cable that is being supplied to the Aluminum Company of Canada Ltd. It will be used to transmit the power developed by hydro-electric generators in a subterranean power house built in the interior of a mountain at Kemano, British Columbia.

PIRELLI-GENERAL *Cables*

MANUFACTURERS OF EVERY KIND OF ELECTRICAL CABLE

PIRELLI—GENERAL CABLE WORKS LTD., SOUTHAMPTON

(Associated Company of The General Electric Co. Ltd.)

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

COUNTY BOROUGH OF SWANSEA

WEST CROSS HOUSING ESTATE
129 TRADITIONAL HOUSES
TENDERS FOR ELECTRICAL INSTALLATIONS

ELECTRICAL ENGINEERS wishing to tender for the electrical installation for 129 Traditional Houses at West Cross Estate are invited to submit applications to the Borough Architect, The Guildhall, Swansea, on or before December 7, 1953.

Plans, specifications and conditions of contract will be forwarded on application and deposit of two pounds, provided applicant gives satisfactory evidence of having previously carried out work of a similar character.

The deposit will be refunded after delivery of a bona fide tender (not subsequently withdrawn) and the return of all documents. The lowest or any other tender will not necessarily be accepted.

T. B. BOWEN,
Town Clerk.

The Guildhall,
Swansea.
November 12, 1953 (F 644)

BOROUGH OF SCUNTHORPE

LIGHTING IMPROVEMENTS

TENDERS are invited for the supply of reinforced concrete columns, mercury discharge lanterns and auxiliary gear and the erection and wiring of 37 No. 25 ft columns and 70 No. 15 ft columns.

Contract documents may be obtained from and drawings inspected at the office of the Borough Surveyor, Mr. Cyril Cooper, M.I.C.E., Comforts Avenue, Scunthorpe, Lincs, on payment of a returnable deposit of £2.

Tenders must be received by the undersigned by 12 noon on Monday, December 7, 1953.

W. P. ERRINGTON,
Town Clerk.

Municipal Offices,
34 High Street, Scunthorpe.
November 7, 1953. (F 610)

COUNTY BOROUGH OF BARNSLEY

ATHERSLEY NORTH ESTATE—STREET LIGHTING

TENDERS are invited for the SUPPLY and DELIVERY of STREET LIGHTING STANDARDS and equipment in connection with the above scheme.

Forms of tender and specifications may be obtained from the Borough Engineer, Town Hall, Barnsley, and completed tenders should be returned in the envelopes provided to reach the undersigned not later than Monday, December 14, 1953.

The Corporation do not bind themselves to accept the lowest or any tender and reserve the right to accept a tender for all or any of the items contained in the specification.

A. E. GILFILLAN,
Town Clerk.

Town Hall, Barnsley.
November, 1953. (F 671)

BOROUGH OF PORT TALBOT

TO ELECTRICAL CONTRACTORS

TENDERS are invited from Electrical Contractors for the execution of ELECTRICAL INSTALLATION works to Council Houses in the Borough of Port Talbot to approximately:—

(a) 520 houses at Cwmavon.
(b) 290 houses in Baglan.

The work consists of the complete supply, erection, connecting up, testing of all cables, socket outlets, lighting points and control distribution units from the supply company terminals and in accordance with current edition of Regulations for the Electrical Equipment

(Continued in next column)

(Continued from previous column)

of Buildings published by the Institution of Electrical Engineers.

Specification and schedule for each scheme can be obtained on application from the Borough Engineer and Surveyor, Municipal Buildings, Port Talbot.

Tenders, sealed and endorsed "Tender—Electrical Installation Cwmavon and/or Baglan," to be delivered to the undersigned not later than 12 noon, December 12, 1953.

W. KING DAVIES,
Town Clerk.

Municipal Buildings,
Aberavon,
Port Talbot. (F 632)

APPOINTMENTS VACANT

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

LONDON COUNTY COUNCIL

REQUIRED in Electrical Division: TECHNICAL ASSISTANTS with experience in preparing specifications for electrical installations in buildings, or in negotiating terms for supply and general consumers' liaison work. Salaries: Holders of H.N.C. (Elec.) or equivalent, up to £721 a year; holders of O.N.C. (Elec.) or equivalent, up to £10s. a week.—Application form from Chief Engineer (53/37), London County Council, County Hall, S.E.1, returnable within next 14 days. (Enclose S.A.E.) (1247.) (F 672)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, GENERAL ASSISTANT ENGINEER in District 347 (Cardiff East) in the Central Sub-Area.

Applicants should have a sound experience of the layout and construction of mains and substations.

Salary in accordance with Class "G," Grade 10 (£808 to £819 to £830) of N.J.B. Schedule.

Applications, stating age, present position and salary, qualifications and experience, together with three referees, to be addressed to the Secretary, to arrive by November 26, 1953.

D. G. DODDS,
Secretary.

St. Mellons,
Cardiff. (F 654)

MIDLANDS ELECTRICITY BOARD

DISTRICT MANAGER
West Bromwich.

APPLICATIONS are invited for the post of District Manager, West Bromwich, Staffs, which district is classified "F" under the N.J.B. Agreement.

Applicants should have sound experience in the engineering and commercial development and maintenance of electricity distribution systems, in electrical contracting work and in general supervision and management. Technical qualifications desirable.

The salary will be provisional pending settlement of the N.J.M. and H.E. Grades Salary Scales.

Applications giving details of age, experience, qualifications and present position and salary should be forwarded within 14 days to Sub-Area Manager (Ref. CW), Midlands Electricity Board, Toll End Road, Tipton, Staffs.

A. STEPHENS,
Secretary.
(F 669)

MIDLANDS ELECTRICITY BOARD

APPLICATIONS are invited for the following superannuable posts:

PRINCIPAL ASSISTANT
Board Headquarters

Applications are requested from men with experience (preferably, but not essentially within the electrical industry) to train appropriate new entrants to the Board in the fundamentals of sales and service and to suggest new ideas and methods to existing staffs. Applicants should have extensive experience in this type of work, backed by a sound knowledge of practical salesmanship gained in a substantial organisation. The successful applicant will be expected to operate anywhere in the Board's area as required. The post is one of responsibility and a commensurate salary will be paid to a suitably qualified man. Conditions of service will be those of the National Joint Council (Admin. and Clerical Grades) of the electricity supply industry. Apply, in writing, within 14 days, stating age, experience, present salary and position, to the Secretary, Midlands Electricity Board (Ref. FWC), Mucklow Hill, Halesowen, near Birmingham.

GENERAL ASSISTANT DISTRICT ENGINEER
Dean Forest District, Central Gloucestershire Sub-Area

Experience necessary in all branches of distribution work including operation and maintenance of high and low voltage cables and overhead lines, substations, etc. Technical qualifications desirable. Salary £531 to £547 per annum (N.J.B. Grade "D.10"). Apply, in writing, within 14 days, stating age, experience, present salary and position and quoting Ref. GLOS/T.190, to Sub-Area Manager, Midlands Electricity Board, 128 London Road, Gloucester.

GENERAL ASSISTANT ENGINEER
(Maintenance Department), South Staffs and North Worcs. Sub-Area Headquarters

Duties will include assisting with the maintenance of sub-station plant, with the testing of switchgear, cables and associated protective equipment and with the maintenance of a large private automatic telephone system. Technical qualifications desirable. Salary £661 to £681 per annum (N.J.B. Class "M." Grade 13). Apply, in writing, within 14 days, stating age, experience, present salary and position, to Sub-Area Manager (Ref. CW), Midlands Electricity Board, Toll End Road, Tipton, Staffs.

JUNIOR OR GENERAL ASSISTANT DISTRICT ENGINEER
Leek District, North Staffs Sub-Area

Some experience in the erection of overhead lines is required. Technical qualifications desirable. Salary £390 to £524 p.a. (N.J.B. Grades "E.15/E.11"). The successful candidate may have the opportunity of renting living accommodation from the Board. Apply, in writing, within 14 days, stating age, experience, present salary and position, to District Manager, Midlands Electricity Board, Station Street, Leek, Staffs.

A. STEPHENS,
Secretary.
(F 658)

BRITISH ELECTRICITY AUTHORITY

South Western Division

TECHNICAL STAFF VACANCIES

(a) SHIFT CHARGE ENGINEER, Feeder Road Generating Station. N.J.B. "E" 7, £649 to £681.

(b) STATION SHIFT CONTROL ENGINEER, Plymouth "B" Generating Station. N.J.B. "G" 10, £608 to £630.

Superannuation scheme.

Candidates for (a) should have had considerable generating station experience. Graduate or Corporate Membership of a recognised Engineering Institution or equivalent desirable.

For (b) should possess good technical qualifications, and have had training and experience in the control and operation of steam generating plant and main switchgear.

Applications on Form A.E.8/ACT, obtainable from the Divisional Secretary, 26 Oakfield Road, Bristol 8, should be completed and returned by November 30, 1953.

(F 633)

NORTH EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the appointments of GENERAL ASSISTANT ENGINEERS in the Chief Engineer's Department, Operation and Maintenance Section, System Protection Sub-Section, with location at (a) Area Board Headquarters, Newcastle-upon-Tyne (b) Tees Sub-Area, Middlesbrough.

Applicants must possess Higher National Certificate in Electrical Engineering or its equivalent, and have had experience in testing, commissioning and maintenance of high voltage protection equipment.

Salary, Schedule "C," Grade 8, £501 to £694. N.J.B. conditions of service.

Applications, stating age, qualifications and experience, should be forwarded to the Secretary (Establishments), The North Eastern Electricity Board, Carliol House, Newcastle-upon-Tyne 1, within ten days of the appearance of this advertisement. (F 653)

NORTH WESTERN ELECTRICITY BOARD

APPOINTMENT OF SECOND ASSISTANT ENGINEER
Industrial Development Section,
Chief Commercial Officer's Department,
Area Board Headquarters, Manchester

DUTIES will include investigation in the utilisation of electricity in industrial premises and the development of public lighting.

Experience in power sales work dealing with the application of electricity to industry and a sound knowledge of illuminating engineering is desirable.

Technical qualifications should be up to the standard of Associate Membership of the Institution of Electrical Engineers.

Salary range: £834-£1,083 per annum. Class "AX-EX," Grade 2. N.J.B. conditions.

Commencing salary within the range £834-£970 per annum.

Applications to the Establishment Officer, The North Western Electricity Board, Cheetwood Road, Manchester 8, by November 28, 1953.

APPOINTMENT OF GENERAL ASSISTANT ENGINEER (POWER SALES)
Sub Area Consumers' Engineer's Department, Blackburn

Applicants should have had practical training and preferably electrical engineering experience in the utilisation of electricity in industry.

Experience in changeover from D.C. to A.C. and street lighting is desirable.

Preference given to applicants who possess the H.N.C. in electrical engineering.

Salary scale: £552-£573 per annum. Grade "J.13." N.J.B. conditions.

APPOINTMENT OF SECOND ASSISTANT DISTRICT ENGINEER
Rossendale District

Duties will include assistance in the operation, maintenance and construction of U/G. and O/H. mains, substations and transformers, and general mains and standby duties.

Preference given to applicants who are Corporate or Graduate Members of the Institution of Electrical Engineers, or who possess the H.N.C. in electrical engineering.

Salary scale: £649-£681 per annum. Grade "E.7." N.J.B. conditions.

Applications for the above posts, to Sub-Area Manager, No. 5 Sub-Area, The North Western Electricity Board, Jubilee Street, Blackburn, by November 28, 1953. (F 611)

BRITISH ELECTRICITY AUTHORITY

GENERATION CONSTRUCTION Sub-Department, Headquarters, London, require:—

(a) PRINCIPAL ASSISTANT ENGINEER (ELECTRICAL) responsible for the supervision of a section concerned with the production, inspection and test of electrical plant associated with the authority's power station and transmission construction programmes. Wide up-to-date experience in methods and procedures for the production, inspection and test of such plant is essential and knowledge of modern manufacturing processes would be an advantage.

(b) PRINCIPAL ASSISTANT ENGINEER (CO-ORDINATION) to supervise engineers co-ordination power station construction work in several divisions. Duties include visits to power stations and attendance at site meetings. Practical experience in modern power station construction, including handling of contracts, preparation of commissioning programmes, work on site and co-ordination of projects from inception to commissioning is essential.

Candidates should preferably be Corporate Members of the I.E.E. (for "a") and the I.Mech.E. or the I.E.E. (for "b"). Salaries will be within the provisional range £1,300 to £1,575 inclusive.

Applications stating age, qualifications, experience, present position and salary to D. Moffat, Director of Establishments, British Electricity Authority, Winsley Street, London W.1 by December 5, 1953. Quote Ref. ET/430. (F 635)

YORKSHIRE ELECTRICITY BOARD

No. 6 (Hull) Sub-Area
Hull District
JUNIOR ENGINEERS
(Two posts)

APPLICANTS should hold the Higher National Certificate in Electrical Engineering, or equivalent qualifications, and have had training and experience in the construction, operation and maintenance of h.v. and l.v. overhead and underground distribution systems.

The successful candidate will be required to reside in Hull or the immediate vicinity, and may be required to carry out standby duty.

Salary: N.J.B. Class "H", Grade 17/14, £402 to £516 p.a.

Applications, giving full details of age, qualifications and experience, together with the names of two referees, should be forwarded to the Manager, No. 6 (Hull) Sub-Area, Yorkshire Electricity Board, Ferensway, Kingston-upon-Hull, not later than November 26, 1953. (F 634)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary, including London allowance, and conditions of service in accordance with N.J.B. Agreement, Schedule A or C. Qualifications entitling to Graduate Membership of the I.E.E. or I.Mech.E. for posts (b) and (c) and Corporate Membership for post (a).

(a) DEPUTY STATION SUPERINTENDENT
Watts Grove and Glaucus Street Generating Stations

Experience in administrative duties, programming of maintenance work and efficient operation of plant. Salary: Class "E," Grade 3—£900 18s. p.a. Applicants who applied for previous advertisement will be considered and need not apply.

(b) GENERAL ASSISTANT ENGINEER (EFFICIENCY & TEST)
Group II Headquarters

Experience of the testing and/or operation of the mechanical plant in a generating station. Salary: Class "AX," Grade 8—£529 1s. to £670 19s., ultimately rising to £749 14s. (EX. 8) p.a.

(c) ASSISTANT ENGINEER (BOILER HOUSE)
Deptford East Generating Station

Sound engineering training and be conversant with the operations of modern high-pressure power station plant. Salary: Class "H," Grade 12—£583 5s. p.a.

Application may be made on form obtainable from Divisional Secretary, B.E.A., London Division, Generation House, Great Portland Street, W.1, and be received within 14 days of this advertisement. (F 646)

SOUTHERN ELECTRICITY BOARD

ASSISTANT ENGINEER (GENERAL)

SOUTHAMPTON District of No. 4 (Bournemouth) Sub-Area. Salary N.J.B. Class "F," Grade 12, Column 1 (£507 per annum). N.J.B. conditions of service.

Applicants should have had experience in the design, construction, operation and maintenance of h.v. and l.v. overhead and underground distribution systems, substation plant and distribution equipment. The appointment will involve stand-by duties.

Applications on forms obtainable from the Sub-Area Secretary, 1 Priory Road, Bournemouth, and returned to him in envelopes suitably endorsed not later than November 30, 1953.

DEMONSTRATOR

Swindon District of No. 2 (Newbury) Sub-Area. Salary N.J.C. Grade 1 (£380 to £470 per annum). N.J.C. conditions of service.

Applicants should be women who are qualified to advise generally on the utilisation of electric domestic appliances, to give public demonstrations of apparatus and to assist in showroom duties. The possession of an E.A.W. Certificate or equivalent domestic science qualification would be an advantage.

Applications on forms obtainable from the Sub-Area Secretary, 7 Oxford Road, Newbury, and returned to him in envelopes suitably endorsed not later than November 30, 1953.

The successful candidates for the above appointments will be required to contribute to the B.E.A. and Area Board's Superannuation Scheme, if eligible. (F 649)

SOUTH EASTERN ELECTRICITY BOARD

DISTRICT COMMERCIAL ENGINEER
Maidstone District.

SALARY of £803 to £834 per annum under the N.J.B. Schedule, Class "E," Grade 4. Superannuable. Appropriate technical qualifications an advantage.

Applicants must be experienced in the supervision and organisation of all installation work and showroom management the preparation of estimates for domestic, commercial and industrial installations, and capable of developing agricultural load. The successful applicant will be responsible to the District Manager for the commercial department.

Applications, giving two referees must reach E. E. Pope, M.I.E.E., Maidstone Manager, SEEBoard, Fairmeadow, Maidstone, Kent, by November 30, 1953.

A. L. BURNELL,
Secretary.
(F 651)

BRITISH ELECTRICITY AUTHORITY

Southern Division S/13.462

APPLICATIONS are invited for the position of SECTION ENGINEER (Third Assistant Engineer—Section), Poole.

Applicants should have had extensive experience in the maintenance and operation of high voltage overhead lines and transforming stations up to 132 kV and be capable of taking charge of a section organisation.

Salary, Class "AX/CX," Grade 4, £763 to £949.

Special application forms, obtainable from P. D. A. Oliver, Divisional Secretary, 111 High Street, Portsmouth, should be returned by December 2, 1953. (F 656)

HER MAJESTY'S COLONIAL SERVICE

Vacancies for
(a) SENIOR SIGNALS OFFICER (CDE. 98/14/02)
and (b) SIGNALS OFFICERS (CDE. 98/14/01)
Aviation Department, Nigeria

DUTIES of (a) to assume executive control of and maintain the aeronautical mobile telecommunications and radio navigational aid equipment at Kano and Lagos airports; to supervise the signals staff and ensure coordination of telecommunications procedures; to advise the Director of Civil Aviation on telecommunications matters, and attend international conferences as Technical Adviser for the West African Territories. Duties of (b) to maintain all aeronautical mobile telecommunications and radio navigational aid equipment at civil aerodromes in Nigeria and to ensure that I.C.A.O. procedures and practices are observed.

Appointments are either pensionable on probation in the salary scale £830 to £1,560 (minimum entry point for Senior Signals Officer, £1,400 per annum) or on contract in the scale £895 to £1,719 (minimum entry point for Senior Signals Officer, £1,513 per annum); point of entry depending on war services and approved experience. A substantial gratuity is payable on satisfactory completion of contract appointment.

Free first-class passages are provided for the officer and his wife, and an allowance of £75 per annum each is payable in respect of a maximum of two children. Leave is granted at rate of 7 days per month of resident service. Government quarters, if available, are provided at low rental.

Candidates must be A.M.I.E.E., or have taken or be exempted from Sections "A" and "B" of the examination for Associate Membership, provided they attain corporate membership within 3 years, or have a first- or second-class honours degree in engineering or physics. Previous experience with aeronautical telecommunications equipment is desirable. A knowledge of modern theory and practice of radio and electricity and its application to air navigation, with particular reference to the procedures and other requirements of the International Civil Aviation Organisation is necessary.

Apply in writing to the Director of Recruitment, Colonial Office, Great Smith Street, London S.W.1, giving briefly age, qualifications and experience. Mention the reference number shown against the post applied for. (F 613)

EASTERN ELECTRICITY BOARD

Northmet Sub-Area

APPOINTMENT OF GENERAL ASSISTANT ENGINEER (Construction) Ref. No. 409

APPLICATIONS are invited for the appointment of a General Assistant Engineer (Construction) at the Sub-Area Construction Department, 15 Friern Barnet Road, London N.11.

Candidates should have had a sound technical training and should have thorough knowledge and experience of the installation of underground cables up to and including 33 kV, working by both direct and contract labour. A sound working knowledge of fault localising and high voltage testing procedure is also desirable.

The salary will be in accordance with Class "N," Grade 13, of the National Joint Board Salary Agreement, commencing at £692 plus London Allowance. Both future salary and conditions of service will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidate will be required to contribute to a superannuation scheme and may be required to undergo a medical examination.

Applications, by letter, stating age, education, qualifications and experience, with details of present appointment and salary, should be submitted to the Manager, Northmet Sub-Area, Eastern Electricity Board, Northmet House, Southgate, London N.14, within fourteen days of the appearance of this advertisement. (F 657)

RADIO TECHNICIANS

REQUIRED as SIGNALS ASSISTANT INSPECTORS OF POLICE by the GOVERNMENT OF KENYA for one tour of two years, extending to three years by mutual consent and with possibility of permanency. Commencing salary, etc., according to previous experience in scale £796, rising to £1,134 a year. Gratuity (at least £162 after two years' service) payable on satisfactory final completion of service. Outfit allowance £30. Uniform allowance £10 a year. Free passages. Liberal leave on full salary. Candidates aged 20-35 should be at least 5 ft 7 in. without footwear, have normal vision without glasses and be of good education. They should possess a sound knowledge of the installation and maintenance of modern low and medium powered V.H.F., static and mobile equipment, h/f transmitters and receivers, petrol generators and diesel electric sets. Previous police experience not necessary.

Apply in writing to the Crown Agents, 4 Millbank, London, S.W.1, stating age, name in block letters, whether married or single, full qualifications and experience and quote M1/35631/EE. (F 621)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

ENGINEERING DRAUGHTSMAN required in the Engineering Department of No. 3 Sub-Area Headquarters at Chester. Experience of building work essential and knowledge of electrical distribution networks advantageous. Application forms, obtainable on written request from the Manager, No. 3 Sub-Area, Electricity House, Newgate Street, Chester, must be returned to him by November 30, 1953.

ENGINEERING DRAUGHTSMAN (ARCHITECTURAL) required in the Engineering Department at the Headquarters of the Board in Liverpool. Applicants must have experience in building work as applied to industrial and commercial premises and/or reinforced concrete structures and foundations, and should have obtained the Ordinary National Certificate or equivalent. Applications should be made on forms obtainable from the Establishments Officer, Electricity House, Love Lane, Liverpool 3. Closing date, November 30, 1953.

Salaries for both appointments within range £433/£567 p.a. (N.J.B., Schedule "D," Grade 6). Appointments superannuable and subject to medical examination.

(F 620)

LONDON ELECTRICITY BOARD

PERSONNEL OFFICER

APPLICATIONS are invited for the position of Personnel Officer to the London Electricity Board.

The successful candidate will be required to take charge of the Personnel Department of the Board and should have a thorough knowledge of labour relations work and be conversant with the functioning of negotiating machinery in respect of pay and conditions of service of employees. He will also be responsible for staff welfare, education and training.

The salary for the post will be fixed in accordance with the scales to be agreed by the National Joint Managerial and Higher Executive Grades Committee and, in the meantime, the provisional commencing salary will be fixed within the range of £1,900 to £2,200 a year, dependent upon the qualifications and experience of the person appointed.

Applications should be addressed to the Secretary, London Electricity Board, 46 New Broad Street, London E.C.2, not later than December 7, 1953.

W. H. WARHURST,
Secretary.

November 13, 1953. (F 659)

BRITISH ELECTRICITY AUTHORITY

RESEARCH LABORATORIES, Leatherhead, require

1. JUNIOR ENGINEERS. N.J.B., Grade 6, £390-£606.
2. GENERAL ASSISTANT ENGINEER. N.J.B., Grade 5, £531-£732.

Candidates for Grade 6 should have a Higher National Certificate or equivalent qualification in electrical or mechanical engineering or in physics. For Grade 5, a university degree in electrical or mechanical engineering or in physics is desirable. Duties include testing, development and research work in the laboratories and in the field, in connection with generation, transmission and distribution of electricity.—Forms from D. Moffat, Director of Establishments, Winsley Street, London W.1, to be returned by December 5, 1953. Quote reference ET/429. (F 612)

NORTH EASTERN ELECTRICITY BOARD

Harrogate Sub-Area

APPLICATIONS are invited from engineers with suitable technical training and experience for the appointment of THIRD ASSISTANT ENGINEER, Commercial Officer's Department, Sub-Area Headquarters, Harrogate. Salary, Schedule "A," Class "G," Grade 10: £608 to £630. N.H.B. conditions of service.

Applications stating age, qualifications and experience should be forwarded to the Secretary, (Establishments), The North Eastern Electricity Board, Carliol House, Newcastle-upon-Tyne 1, within 10 days of the appearance of this advertisement. (F 652)

BRITISH ELECTRICITY AUTHORITY

Southern Division

S/13.461.

APPLICATIONS are invited for a post of SHIFT CHARGE ENGINEER, Oxford Generating Station. Applicants should be in possession of technical qualifications admitting to Corporate Membership of a recognised professional institution, have had previous experience of an electricity generating station, and preferably have had manufacturing works experience.

Salary N.J.B. Grade D.7, £633 to £843.

Special application forms, obtainable from P. D. A. Oliver, Divisional Secretary, 111 High Street, Portsmouth must be returned by December 2, 1953. (F 670)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions within the Division.

CIVIL ENGINEERING DRAUGHTSMEN
Construction Department. Vacancy No. 22/53.

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with office and administrative buildings.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

ENGINEERING DRAUGHTSMEN (MECHANICAL)
Construction Department. Vacancy No. 44/53.

Senior Draughtsmen are required in the Mechanical Section of the Construction Department at North Wilford Power Station. Candidates should have experience in one or more of the following:

1. Design and layout of power station equipment, including turbo-alternators, boiler plant, coal and ash plant, and general station auxiliaries.
2. H.p. and l.p. steam and feed pipework. Condensing plant and feed heating systems.
3. Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary and conditions of service will be in accordance with the National Joint Board Agreement Grade 5 £567 to £671 per annum) and Grade 6 (£433 to £567 per annum) of Schedule "D" according to experience.

ENGINEERING DRAUGHTSMEN (ELECTRICAL)
Construction Department. Vacancy No. 61/53.

Candidates should have experience in the preparation of layouts and diagrams for the installation of e.h.t. and l.t. switchgear, transformers, e.h.t. and l.t. cables; knowledge of protective gear systems would be an advantage.

The salary will be in accordance with Grade 5 (£567 to £671 per annum) or Grade 6 (£433 to £567 per annum) of Schedule "D" of the National Joint Board Agreement.

GENERAL ASSISTANT ENGINEER
Technical Department, Div. H.Q. Vacancy No. 132/53.

The minimum technical qualification is Higher National Certificate but a degree in Electrical Engineering is preferred for the Divisional Headquarters vacancy.

Applicants must have experience of the operation and maintenance of switchgear and protective gear.

The salary will be in accordance with Schedule "C," Class "AX/DX," Grade 8 (£501 to £694 per annum) of the National Joint Board Agreement.

The closing date for this appointment will be November 26, 1953.

THIRD ASSISTANT ENGINEER
Transmission Department, Div. H.Q. Vacancy No. 133/53.

Preference will be given to applicants who are graduates of the Institution of Electrical Engineers or hold equivalent qualifications. They are also required to have had a sound engineering training and subsequent experience in the maintenance and operation of 132 kV overhead lines, transformers and switchgear.

The salary will be within Schedule "C" Class "AX/DX," Grade 5, (£849 to £858 per annum) of the National Joint Board Agreement.

The closing date for this appointment will be November 26, 1953.

JUNIOR ENGINEER
Avon Power Station. Vacancy No. 134/53.

Applicants should possess the Higher National Certificate in engineering and have had operating experience in a steam power station. The duties will include assisting in testing of plant, maintenance of instruments and in the technical work of the station.

Salary for this appointment is £445 per annum within Class "E," Grade 14, of the National Joint Board Agreement.

The closing date for this appointment is November 26, 1953.

The above positions will be pensionable within the provisions of the British Electricity Authority and Area Boards Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned by the dates stated. Please quote vacancy number.

L. F. JEFFREY,
Divisional Controller.
(F 655)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

HER MAJESTY'S COLONIAL SERVICE

Uganda

A VACANCY exists for a SUPERINTENDENT OF POLICE for the maintenance and operation of h.f. and v.h.f. radio equipment and the supervision of European and African staff. The successful candidate will be placed in charge of a new Police Radio Section.

Candidates should be between 30 and 35 years of age. They must hold the City and Guilds Final Certificate in Radio Communications, a pass in the B.B.C. (D) examination, or an equivalent or higher qualification, and be experienced in the installation and operation of h.f. medium power transmitters and receivers, v.h.f. communication networks and teleprinter services. They should have experience of the administration of radio concerns and of workshop installation.

Appointments are on two years' probation for permanent and pensionable employment. Salary is in scale £1,020 to £1,140 per annum according to qualifications and experience. Temporary cost-of-living allowance is payable. (At present £350 per annum). Income tax at local rates. Free passages up to cost of three adults' sea passages on appointment and on leave. Government quarters at moderate rent.

Applicants should write to the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith Street, London, S.W.1, giving personal particulars, qualifications and experience and quoting CDE 55/9/05. (F 650)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

Littlebrook Power Station
(Class M—480 MW)

SHIFT CHARGE ENGINEER. Applicants should preferably hold an Engineering degree or be Corporate Members of the Institution of Electrical Engineers and/or Institution of Mechanical Engineers, and have had extensive experience in the operation of modern high pressure turbine and boiler plant and E.H.T. switchgear. Considerable experience in administration and in the control of labour essential. Preference will be given to those with P.F. experience. Assistance with housing accommodation may be possible for those living at present in rented property. Grade 7 £1,035 6s. p.a., including London allowance.

JUNIOR ENGINEER (CONTROL). Applicants should preferably have had experience in the operation of E.H.T. switchgear and the parallel running of alternators. Grades 21/17, commencing at £427 p.a., including London allowance. Applications, giving details of education, present position, experience, etc. should be received by the Station Superintendent, Littlebrook Generating Station, nr. Dartford, Kent, not later than November 28. (F 645)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 203/53. SHIFT CHARGE ENGINEER at Chadderton (L.P) Generating Station, near Oldham. Salary £649/681 (E.7). Applicants should be qualified engineers with wide experience of boiler plant and associated equipment, and sound knowledge of electro-technology. Duties consisting of taking charge of 41 MW of generating plant on 5-cycle shift basis.

Vacancy No. 261/53. STATION SHIFT CONTROL ENGINEER at Accrington Generating Station. Salary £531/547 (D.10).

Applications, in writing, quoting vacancy No. to Establishments Officer, British Electricity House, 625 Wilmslow Road, Manchester 20, before November 27. (F 647)

ASSISTANT MECHANICAL MAINTENANCE ENGINEER required for organisation in East London district, operating large electrical station. Applicants should have wide and up-to-date experience in the maintenance of modern generating station power plant and be capable of supervising turbine and boiler overhauls. Technical qualifications should be sound. Age not less than 32 or over 45. Commencing salary approximately £950 per annum with non-contributory pension. Position has excellent prospects.—Reply to Box No. 3061, Electrical Times, quoting Ref. TME/7. (F 636)

ASSISTANT to WORKS MANAGER required by well-known domestic appliance manufacturers in the Home Counties employing 2,000. Applicants should be between the ages of 30 and 40, have good technical qualifications and general experience, and should have held a position of responsibility. Should be conversant with modern production methods and have knowledge of press and sheet metal work, welding, assembly and finishing processes. Replies, which will be dealt with in confidence, should give full details of education, positions held with salaries. Starting salary will be commensurate with age and experience and there are good prospects for the right man.—Box No. 3045, Electrical Times. (F 600)

BRUCE PEEBLES AND CO., Ltd., Engineers, Edinburgh, S. require an ASSISTANT INSULATION ENGINEER for all types of rotating machines up to 11 kV.—Applications, stating age, qualifications, experience and salary required, should be submitted to Mr. V. P. Mackay, Manager, Rotating Plant Department at the above address. (F 622)

CHIEF WORKS ENGINEER required for factory in North London area. Must have good experience in design, construction and maintenance of factory plant, buildings and services, including ventilation problems. Ability to organise, and co-ordinate the various maintenance and service sections, and to introduce a preventive maintenance system for continuously running plant is essential. Knowledge of lamp and electronic valve industry an advantage. Starting salary £1,250 p.a. Staff pension scheme in operation.—Box No. 3069, Electrical Times. (F 660)

DRAUGHTSMAN (ELECTRICAL) required for integrated iron and steel works. Previous experience in the iron and steel industry not essential, but candidates must have had experience in designing, estimating and preparing specifications for factory electrical installations. Applicants should be under 30 years of age and possess at least a National Certificate in electrical engineering.

Applications, giving age and details of qualifications and experience, and stating the salary required, should be submitted to the Chief Engineer, Workington Iron and Steel Co., Moss Bay, Workington, Cumberland. (F 614)

ELECTRIC MOTORS. There are opportunities with an established Manufacturing Company for inside SALES ENGINEERS to handle inquiries and orders for industrial motors. Vacancies in London, Birmingham and Cardiff. Generous salary offered with participation in non-contributory Pension Scheme.—Box No. 3053, Electrical Times. (F 623)

ELECTRICAL CONTRACTOR (London) has vacancy for ESTIMATOR used to large contracts, capable of handling them from inquiry to completion. Exceptional opportunity for experienced man able to accept responsibility. Applications will be treated confidentially. State age, salary, with concise particulars of experience.—Box No. 3063, Electrical Times. (F 637)

ELECTRICAL CONTRACTOR requires ESTIMATOR and SUPERVISOR for small contracts London area. Write, stating age, experience and salary required.—Box No. 3035, Electrical Times. (F 571)

ELECTRICAL ENGINEER is required for service with The Bahrain Petroleum Co., Ltd. Applicants must have degree or A.M.I.E.E. and have had 3 to 5 years' experience of layout and installation covering power plant, electrical generators, switchgear, substations, motors and light and power installations in buildings. Age limits 25 to 35 years. Commencing salary £1,140 p.a. board and lodging being provided in addition, other living costs being low. Permanent positions with salaried home leave every 24 or 30 months. Kit allowance and pension scheme.—Apply with full particulars to Box No. 3065, Electrical Times. (F 638)

ELECTRICAL ENGINEER, A.M.I.E.E. or exempting examination, aged 27/38 years, possessing a comprehensive knowledge of electrical installation work in all types of buildings, including factories, hospitals, schools, cinemas, etc., and fully conversant with the recognised wiring systems and all relevant regulations governing this type of work. Must possess knowledge of building construction and be capable of reading architects' and engineers' drawings. Able to prepare complete electrical specifications and illumination schemes. Five-day week. Pension fund.—Reply to Box No. 3066, Electrical Times, giving details of age, qualifications, experience and salary required. (F 673)

ELECTRICAL PLANT INSPECTOR required for duty in the Bournemouth area. Permanent position carrying progressive salary scale: £540 to £785 with non-contributory pension. Candidates aged 25-32 years with apprenticeship in the manufacture or repair of electrical machinery and preferably with subsequent experience of industrial electrical machinery and who have gained the National Certificate in Electrical Engineering are invited to apply to the Engineer and Manager, Engineering Department, General Accident Fire and Life Assurance Corporation, Ltd., 99 Aldwych, London W.C.2. (F 639)

ELECTRONIC ENGINEER required for turbine laboratory. Applicants should possess a degree in electrical engineering. Previous experience in physics, electrical engineering or instrument technology would be an advantage. Pension scheme.—Apply: Personnel Officer, Sir George Godfrey and Partners, Ltd., Hampton Road West, Hanworth, Middlesex. (F 607)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

G.E.C. WITTON ENGINEERING WORKS

EXPERIENCED ENGINEERS

wanted to take charge of two sections of the Design and Drawing Office.

(a) **ENGINEER-DESIGNER** with good mechanical qualifications for outdoor high voltage circuit breakers and metalclad switchgear.

(b) **ENGINEER,** experienced in the layout of outdoor high voltage substations, including the preparation of control diagrams and cable layouts.

Apply in person or by letter to the Staff Manager, The General Electric Co., Ltd., Witton, Birmingham 6. (F 648p)

ELECTRONIC ENGINEER with practical experience in industrial applications and good technical knowledge is required by a large food organisation centred in London, for the development, design and construction of electronic equipment. Applicants should have initiative and be resourceful. Post will be of supervisory grade and salary according to age and experience. —Apply Box No. 3067, Electrical Times. (F 625)

ESTIMATORS required for the Overhead Line Contracts Department in London. Responsible positions calling for some knowledge of overhead line contracts procedure. Minimum age, 25 years. Five-day week. Pension fund. Staff canteen. Salary according to qualifications and experience.—Apply in writing to Staff Officer, British Insulated Callender's Construction Co. Ltd., 21 Bloomsbury Street, London W.C.1. (F 674)

FERRANTI LTD. wish to make new appointments in their Power Transformer Design Office and invite applications from suitable candidates for positions as DESIGN ENGINEERS. A University degree is desirable but other alternative qualifications will be considered. Previous design experience in power engineering (not necessarily on transformers) would be an advantage. Applications are also invited from young graduates or holders of the Higher National Certificate with an interest and preferably some experience in design of transformers, or other electrical plant.

The appointments are to the permanent staff of an expanding design group and carry attractive salaries with excellent prospects of advancement. The positions are covered by the firm's Staff Pension Scheme.

Forms of application from Mr. R. J. Hebbert, Staff Manager, Ferranti Ltd., Hollinwood, Lancs. Please quote reference WLE. (F 548)

HANDLEY PAGE (READING), LTD., The Aerodrome, Woodley, Reading, have a vacancy in their Design Office for a SENIOR AIRCRAFT ELECTRICAL DRAUGHTSMAN. They have an interesting project on hand, the post is progressive and offers good scope for advancement to the right man.—Please send full particulars to the Personnel Officer. (F 640)

JUNIOR DRAUGHTSMAN required by leading firm of fluorescent fittings manufacturers. Previous drawing office experience an advantage. Good commencing salary. Pension fund. Five-day week.—Please write to Box A.924, Central News, Ltd., 17 Moorgate, London E.C.2. (F 615)

MARRYAT AND SCOTT, LTD., of Wellington Works, Hounslow, Middlesex, require LIFT DRAUGHTSMEN for layout work and design. Bonus and superannuation.—Apply in writing with full details of past experience. (F 588)

METER MANUFACTURERS, N.W. London, require SENIOR AND JUNIOR TEST ENGINEERS for progressive posts in their Test Depts. State education, technical training, experience, salary required.—Box 3071, Electrical Times. (F 661)

MARCONI INSTRUMENT CO., LTD., St. Albans. Vacancies exist for both SENIOR and JUNIOR ELECTRONIC ENGINEERS with this well-known company. The vacancies which arise from an expansion of the company's business, cover a large field. APPLICATIONS ARE PARTICULARLY WELCOMED FROM YOUNG GRADUATE ENGINEERS who have had some industrial experience. For the junior vacancies the minimum technical qualification required is the City and Guilds Final Certificate in telecommunications. The posts are both pensionable and permanent.—Applications, which will be treated with the strictest confidence, should be sent to Dept. C.P.S., 336/7, Strand, London W.C.2, quoting Ref. No. S.A.34. (F 626)

OVERHEAD TRANSMISSION LINESMAN required for service in British West Africa, with experience on h.t. work. Only skilled men need apply.—Write stating age, experience and whether married or single. Box 3073, Electrical Times. (F 662)

PERMANENT positions with excellent opportunities will be offered to applicants suitably qualified for the following:

(a) DESIGNERS experienced in electronic control gear. Good electrical and mechanical design and layout ability essential.

(b) SENIOR DRAUGHTSMEN with electrical/mechanical experience required for motor control gear, knowledge of electronics advantageous. Thorough shop training and extensive drawing office experience essential.

(c) DRAUGHTSMEN required for mechanical and electrical work on industrial electronic equipment. Experience on this type of product whilst an advantage is not essential and men with good electrical or mechanical drawing office experience will be considered.

Vacancies exist in a new factory in the Stoke-on-Trent area. Replies giving full details of training experience, also age and salary required, and quoting Ref. AGI to be sent to Box No. 3075, Electrical Times. (F 663)

PIRELLI-GENERAL CABLE WORKS LTD., require TRANSMISSION LINE SURVEYORS and ASSISTANT ENGINEERS with experience on steel towers and wood pole lines.—Write, giving particulars of experience and salary expected, to Overhead Lines Department, Eastleigh, Hants. (F 589)

PROMINENT FIRM, whose chief productions are lighting and cooking equipment, having office and staff in Glasgow, requires MANAGER for Scotland.—Applications from first class men with requisite experience and sound connection, stating fullest details, to Box No. 3077, Electrical Times. (F 664)

REPRESENTATIVE REQUIRED for Birmingham and Midland Counties by old-established firm manufacturing Electrical Heating and Catering equipment. Own car essential. Write, giving particulars of age, experience, etc.—Box No. 3059, Electrical Times. (F 627)

SALES DEPARTMENT MANAGER, Cable Works in London Area, to supervise preparation of deliveries to customers (home and overseas), advices, dispatch, invoicing, export procedure and technicalities, etc. Required to attend to all customers' inquiries and queries, must be tactful, able to control mixed staff, and to co-operate willingly and effectively with the other departments. Only those with good knowledge and experience on selling side of cable industry will be considered.—Full particulars, experience, salary required, to Box No. 3079, Electrical Times. (F 665)

SENIOR SALES ENGINEER, with specialised knowledge of industrial motors and control gear, to be responsible for small group of Sales Engineers. Appointment based on London. Generous salary and expenses. Non-contributory pension scheme.—Box No. 3055, Electrical Times. (F 624)

TECHNICAL ASSISTANTS required for the Overhead Line Contracts Department in London. Duties involve structural design in connection with overhead transmission and distribution lines. Higher National Certificate in Civil or Electrical Engineering required. Age 25/35. Five-day week. Pension fund. Staff canteen. Salary according to qualifications and experience.—Apply in writing to Staff Officer, British Insulated Callender's Construction Co. Ltd., 21 Bloomsbury Street, London W.C.1. (F 675)

G.E.C. WITTON ENGINEERING WORKS VACANCIES

SENIOR DRAUGHTSMEN experienced in:—
Large A.C. and D.C. Machines.
Circuit Breakers and metalclad switchgear.
Contactors and Controllers.
Switch and Control Board Layout.
Diagrams of Connections for Power Schemes.
Jig and Tool Practice.

Apply in person or by letter to Staff Manager, The General Electric Co. Ltd., Witton, Birmingham, 6. (F 630p)

THE RESEARCH LABORATORIES of The General Electric Co., Ltd., North Wembley, Middx., have vacancies for physics or electrical ENGINEERING GRADUATES, preferably with an Honours degree, to work in the field of electronic circuitry of the pulse communications and computor type. Candidates must have completed National Service.—Apply in writing to Staff Manager (Ref. RLO/9), giving full particulars of age, qualifications and experience. (F 628)

TRAINING OFFICER required to administrate and develop training schemes embracing all grades from apprentice to supervisory level. Applicants must have an engineering background and be fully experienced in modern training technique.—Applications in writing, including details of experience, background and age, to Personnel Officer, Igranic Electric Co., Ltd., Bedford. (F 629)

TRANSFORMER TESTER required, S.E.13 area. Experience up to 10 kVA.—Write stating age, experience, technical training and salary required to Box No. 3067, Electrical Times. (F 641)

TRANSMISSION ENGINEER required by British Insulated Callender's Construction Co., Ltd. To work on technical investigations and developments in all spheres of transmission and distribution, particularly the structural and electrical aspects of overhead lines of every working voltage. Qualifications: Degree or equivalent. Supply experience an advantage. Pension fund. 5-day week.—Applications to Staff Officer, British Insulated Callender's Construction Co., Ltd., 21 Bloomsbury Street, London W.C.1. (F 642)

TRAVELLING ELECTRICIAN/SALESMAN required by Christian firm to service and install electrical apparatus throughout country and later solicit new business. Must be keen Christian, have good electrical knowledge, appearance and address. Single man under 40 preferred, as away most of week and some week-ends. Good salary, expenses and commission.—Apply in own handwriting, with photo, stating age, experience, present earnings, when free and full personal details, including Christian connection, to "P," c/o J. E. May Ltd., Advt Agents, 19 Ludgate Hill, London E.C.4. (F 444)

WELL-KNOWN Electrical Manufacturing Company has vacancies for SALES ENGINEERS for industrial motors in various parts of the country. Successful applicants must be trained electrical engineers with O.N.C. as a minimum qualification and with previous sales experience in the areas covered. They will work from the company's existing branch offices. Remuneration by salary and expenses. Non-contributory pension scheme.—Apply Box No. 3031, Electrical Times. (F 550)

APPOINTMENTS WANTED

ELECTRICIAN, armature winder wishes employment overseas, age 24, single.—Box No. 3043, Electrical Times. (F 595)

WORK WANTED

A.C. and d.c. MOTOR REWINDS and REPAIRS. Prompt service fully guaranteed. Edgware 5566 (4 lines).—Service Electric Co., Ltd., Stanmore, Middx. (F 13)

ARMATURE REWINDING service to the trade. Vacuums, Drills, Grinders, Hood Dryers, Dental Motors. Vacuum cleaner and drill armatures replaced from stock 24-hour service. Every job guaranteed. All vacuum cleaner parts, hoses, etc., in stock for any make. Apex washer agitator shafts stocked.—Regam Electric Cleaner Service, 95 Park Lane, Leeds 1. (F 22)

FISHER FOUNDRIES, LTD., Greet, Birmingham, have immediate capacity for machine moulded PRECISION CASTINGS in gunmetal and grey iron, ½ to 30 lb. All castings shot blasted.—Telephone: Birmingham, Victoria 0197. (F 16)

METALWORK. All types cabinets, chassis, racks, etc., to your own specification.—Philpott's Metalworks, Ltd., Chapman Street, Loughborough. (F 616)

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WANTED, for prompt cash, ferrous and non-ferrous SCRAP; also plant for dismantling. Buyers of secondhand machinery and plant for re-use.—W. and H. Cooper, Ltd., 178 Brady Street, Bethnal Green, E.1. (F 1)

WANTED. Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock water-tube boilers. Best prices paid. Prepared to purchase Babcock and Wilcox water-tube boilers for dismantling. —Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath, Staffs. (F 2)

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TWO 2½ kW UNIT HEATERS at £10 each. One 5 kW UNIT HEATER at £20. Made by G.E.C., almost as new. Prices at our works.—Apply, Collier and Son, 2 Ashburnham Road, Northampton. (F 575)

ENGINEERING PLANT & MATERIALS

GALVANISED CONDUIT AND CONDUIT FITTINGS. A large quantity of Galvanised Conduit and Conduit Fittings are available, mainly 2 in., 1½ in. and 1¼ in. with a quantity of 1 in. and ¾ in. conduit fittings. The items are surplus to our requirements and are new and unused. The original cost is over £1,000. Offers wanted.—For full details write Ref. CPA/AR, Simon-Carves Ltd., Cheadle Heath, Stockport. (F 617)

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DISPOSAL OF SECONDHAND LANTERNS AND FITTINGS

THE COUNCIL has for disposal:—
74 Wembley LANTERNS without glassware.
54 glass outer GLOBES.
69 glass refractor RINGS.
Suitable for 500-W metal filament lamps.

Tender forms are obtainable from the Borough Engineer and tenders must be returned to me by noon, December 9, 1953.

R. H. JERMAN,
Town Clerk.
Municipal Buildings,
Wandsworth, S.W.18. (F 643)

PURLEY CHOKES AND BALLASTS. Our 80-W tapped h.p.f. ballast with starter switchgear-holder incorporated is proving itself the most popular unit. Suitable for most fittings 57s. 6d. each subject.—F. W. Blanshard, Ltd. (Dept. E.T.), Purley, Surrey. Uplands 4818-9. (F 14)

GENERATING PLANT

PLANT FOR DISPOSAL at Kettering Generating Station.

Parsons 1,500 kW STEAM TURBINE, geared direct current generator (installed 1921) and condenser, 180 lb. sq in., 600 deg. F., 4,500 r.p.m.; reduction gear, Parsons creep gearing, 4,500 to 400 r.p.m.

D.C. GENERATOR by Mather and Platt, Type P.38, open, 460-500 V, 3,000 amp., 1,500 kW, 400 r.p.m., continuous rating.

Steam-operated multi-ejector AIR PUMP, No. 1900E, 160 lb sq in. (Mirrlees Watson).

CIRCULATING PUMP (rotary) by W. H. Allen, type Conqueror, 1921, 12 in. by 12 in.

Rotary condensate EXTRACT PUMP by W. H. Allen, d.c. motor, 460/500 V, 200/175 amp., 1,370/1,500 r.p.m., 110 b.h.p.

Further details, permission to view and forms of tender may be obtained by application to Divisional Purchasing Officer, British Electricity Authority, East Midlands Division, Barker Gate, Nottingham. (F 679)

PLANT FOR DISPOSAL at Loughborough Generating Station.
One 1,000 kW Brush Ljungstrom TURBO ALTERNATOR complete (installed 1914); 200 lb. p.s.i., 700 deg. F., 28·75 in. vac., 6·6 kV, 50 cycles, 0·6 p.f., 3,000 r.p.m.
One Rees 1,600-gal.-per-min. ROTURBO, c.w. pump, 21 ft. head, direct coupling to 40 h.p., 470 V, 1,100/1,500 r.p.m. d.c. motor.
One Brush Edward type double-throw reciprocating AIR PUMP driven by 8·5 h.p., 470 V, 670/890 r.p.m. d.c. motor.
One spare set Kinghorn VALVES.
One Bracketta BAND SCREEN (width of screen 2 ft).
Also available various CABLES, SHEET STEEL, DUCTING, PIPING, etc.
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540-kW 130/175 V d.c. GENERATOR by Bruce Peebles. 4,125/3,075 amps. Shunt interpole, open type frames, split carcase. Suitable for direct coupling. Speed 428 r.p.m.
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200-kW GENERATOR by Mavour and Coulson, for 500 V d.c., 400 amps. Speed 380 r.p.m. Open type, 6 pole, compound interpolar wound. Single pedestal R.O.B.
200-kW GENERATOR by E.C.C., for 200 V d.c., speed 1,000 r.p.m. Open type, single pedestal bearing. Compound wound, fitted interpoles.
George Cohen, Sons and Co., Ltd., Wood Lane, London W.12. Tel.: Shepherds Bush 2070 and Stanningley, nr. Leeds. Tel.: Pudsey 2241. (F 666)

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A.C.—D.C. QUARTERLY and SLOT METERS.—Brent Electrical Co., 6 Holmdale Gardens, London, N.W.4. (F 5)

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MERCURY SWITCHES are made by Hall, Drysdale and Co., Ltd., of 58 Commerce Road, Wood Green, London N.22. Tel.: BOW. 7221. (F 11)

ONE 400/440/3/50 George Ellison 500 amp. T.P. oil-immersed free handle CIRCUIT BREAKER fitted with no voltage and overload releases. Arranged for door mounting.—Box No. 3083, Electrical Times. (F 668)

THE SWITCHES for sale. Reconditioned or new. 12 months' guarantee. Immediate delivery. Lists, from : J. W. Hughes, 3 St. Thomas' Street, London Bridge S.E.1. (TEL.: HOP. 2759). (F 487)

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Kingsbury Works, Kingsbury Road, London, N.W.9.
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Grams: Lektropowa, Hyde, London. (F 12p)

ONE 400/440/3/50 Allen West Type A Air Break Automatic Contactor pattern direct switching STARTER suitable for 70 h.p. motor in floor mounting totally enclosed sheet steel case complete.—Box No. 3081, Electrical Times. (F 667)

12 NEW Brook R.13 SLIP-RING MOTORS for sale, 7½ h.p., 1,420 r.p.m., 380/420 V, 3-phase, 50-cycle.—F. J. Edwards Ltd., 359 Euston Road, London N.W.1. Euston 4681. (F 677)

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A HIGH VACUUM IMPREGNATION UNIT or single or batch coil impregnation service to R.I.C. Specification 214 or individual requirements.—Blickvac, 505 Lordship Lane, S.E.22. Tel.: Forest Hill 7089. (F 18)

NUMBER of single-phase MOTORS, 3, 4, 5, 6, 7 and 10 h.p., 220 V, 440 V.; Brooks, Crompton Parkinson, etc. STARTERS, GENERATOR SETS, 33 kV TRANSFORMER and MERCURY RECTIFIER SETS. Formation, charging and test PANELS, etc. Also ACCUMULATOR MANUFACTURING PLANT. Offers invited.—Phone: Malden, Surrey, 2464. (F 618)

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Bellis and Morcom 88 MW d.c. set, triple-expansion ENGINE No. 5067, h.p. 1,100, speed 300 r.p.m., date 1912. STEAM CONDENSERS, 155 lb. sq. in. at 500 deg. F., complete with Westinghouse JET CONDENSER and CIRCULATING WATER and AIR PUMPS; 30 h.p. 500 V d.c. MOTOR, speed 700 r.p.m., and STARTER for driving condenser pumps.
Two British Westinghouse d.c. GENERATORS, serial Nos. B.133621, 2,440 kW, 480/550 V, 800 amps., compound wound, speed 300 r.p.m.
Two shunt field RHEOSTATS, chain and sprocket operated.
Four remote control RHEOSTAT PANELS with gear and chain drives, two of these fitted with 0-1,200 ammeter and 1,200 amp single-pole switches.
One white marble SWITCH PANEL fitted with 2 single-pole air-circuit breakers, 2 double-pole switches and 2 single-pole switches. All of 1,200 amp. capacity.
Two combined reverse POLARITY and OVERLOAD RELAYS, Westinghouse Type "D."
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TWO AMMETERS, 0-1,200 amp.
Also engine exhaust PIPEWORK, condenser ISOLATING VALVE, engine EXHAUST ISOLATING and ATMOSPHERIC VALVE; steam inlet PIPEWORK and STEAM SEPARATOR.
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PLANT FOR DISPOSAL at Kettering Generating Station.
Stirling BOILER dated 1920, No. 1909
5 drum (riveted) water tube and internal SUPER HEATER with two chain grate stokers.
3 STEAM DRUMS each 18 ft. 6 in. by 13/16 in by 4 ft. O.D.
2 MUD DRUMS, each 18 ft. by 11/16 ins. by 3 ft. O.D.
680 main water tubes 3½ in. O.D. by 9 gauge. Superheater by Stirling Boiler Co., containing 112 tubes 1¼ in. O.D. by 9 gauge double looped each 26 ft 6 ins. long.
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PLANT FOR DISPOSAL at Avon Generating Station, Warwick. Nos. 5 and 6 boilers.
40 k.lb./hr. Babcock and Wilcox c.t.m. with superposed economiser.
I.D. FAN direct coupled to a 46 h.p. motor.
F.D. FAN direct coupled to a 36 h.p. motor.
No. 1. 10 tons rotary WAGON TIPPLER.
No. 1. BUCKET ELEVATOR an d"U" link conveyor, 20 ton/hr., Edward Bennis and Co., Ltd., 1920.
No. 2. BUCKET ELEVATOR, 20 ton/hr., Babcock and Wilcox, Ltd., 1926.
Nos. 1 and 2 TURBO ALTERNATORS, 3·0 MW. B.T.H. Co., 1920.
Contraflo SURFACE CONDENSER with steam jet air ejectors and condensate extraction pump.
Condensate LEA RECORDER with "Vee" notch.
TANK and FLOAT TANK.
Invincible wet AIR FILTER.
Turbine OIL COOLER and SETTLING TANK.
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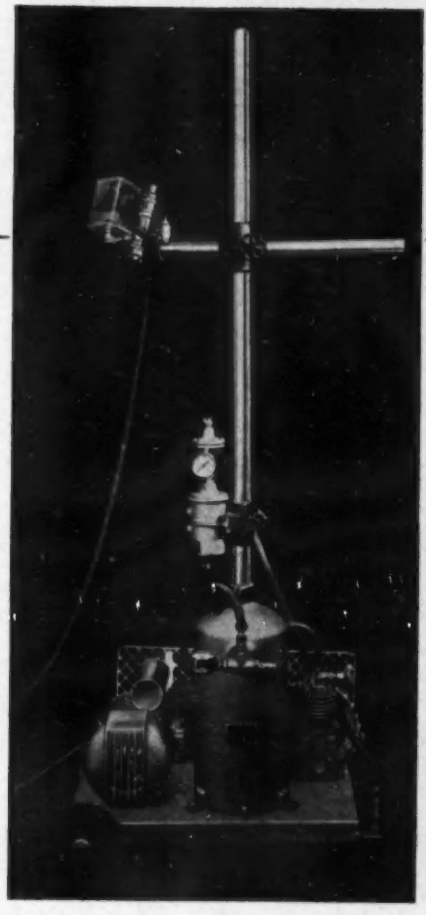
f.h.p. drives for all purposes



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PLANT FOR DISPOSAL at Hinckley Generating Station.

Babcock and Wilcox BOILER No. 20337, date 1919. Capacity 20 k.lb./hr. double drum land type. Drums 24 ft. long by 4 ft. 6 in. by ⅞ in. plate with riveted seams and headers trunking saddles.

280 TUBES 18 ft. long by 4 in. o.d. by 6 s.w.g., working pressure 200 p.s.i.

Super heater 112 TUBES 1½ in. o.d. by 6 s.w.g.

1 CROWN VALVE 7 in. Hopkinsons parallel slide.

1 Isolating N.R. VALVE 7 in. Hopkinsons parallel slide.

1 Spring loaded double SAFETY VALVE, 2½ in., Turnbull, Ltd.

1 Deadweight double SAFETY VALVE, 2½ in., Turnbull, Ltd.

2 Stop and non-return FEED VALVES, 2½ in., Hopkinsons.

2 Check FEED VALVES, 2½ in. Hopkinsons.

2 BLOWDOWN VALVES, 2 in., Hopkinsons parallel slide.

1 SUPERHEATER DRAIN VALVE, 1 in., Hopkinsons parallel slide.

1 SUPERHEATER FLOODING VALVE, 1½ in., Hopkinsons parallel slide.

2 WATER GAUGES, 19½ in. centres, ½ in., Hopkinsons.

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2 STOKER GEAR BOXES.

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THE ASSOCIATION OF SUPERVISING ELECTRICAL ENGINEERS

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SUBJECTS

Electrical Installation Practice.
Electrical Maintenance.

Application forms, copies of regulations and syllabus, and further information can be obtained on application to:—

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The Association of Supervising Electrical Engineers,
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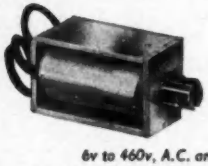

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6v to 460v, A.C. and D.C. versions

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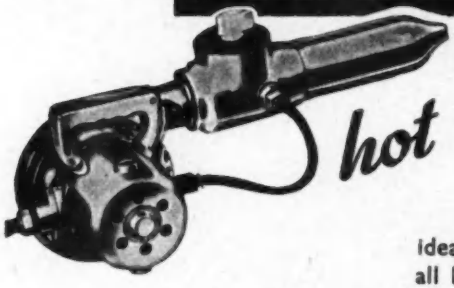
MARTINDALE



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TORQUE UP TO 60 LB.IN.	

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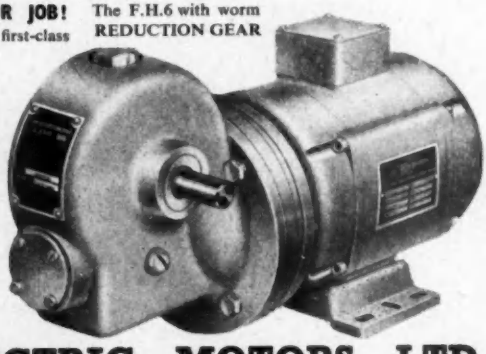

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Rotary Transformers
High Frequency Alternators
H.T.D.C. Generators

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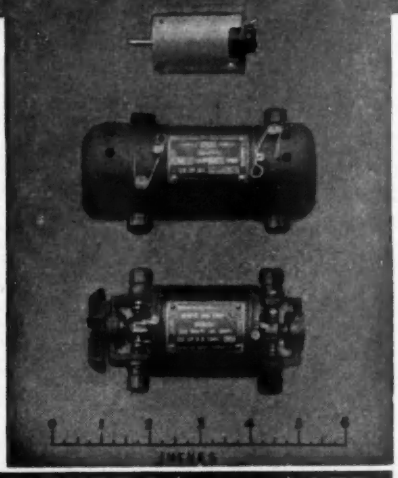

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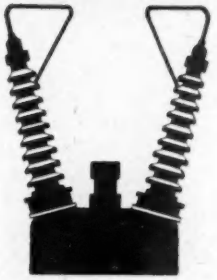

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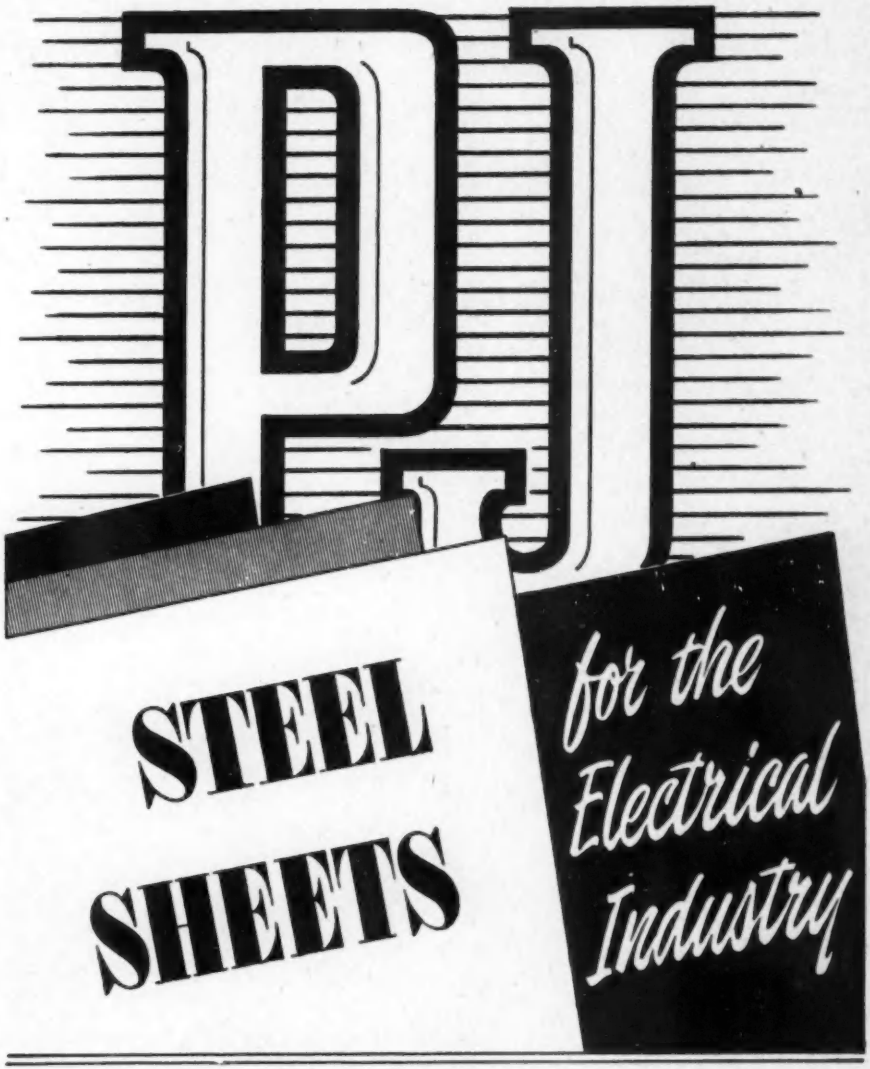

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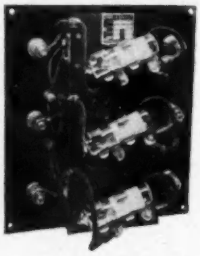

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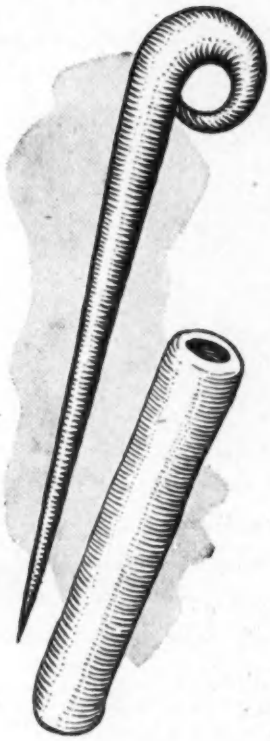

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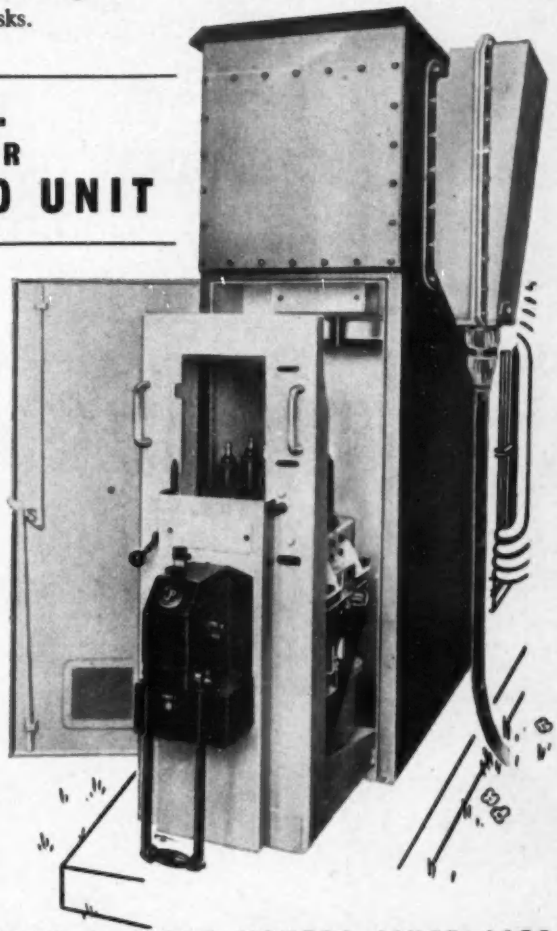

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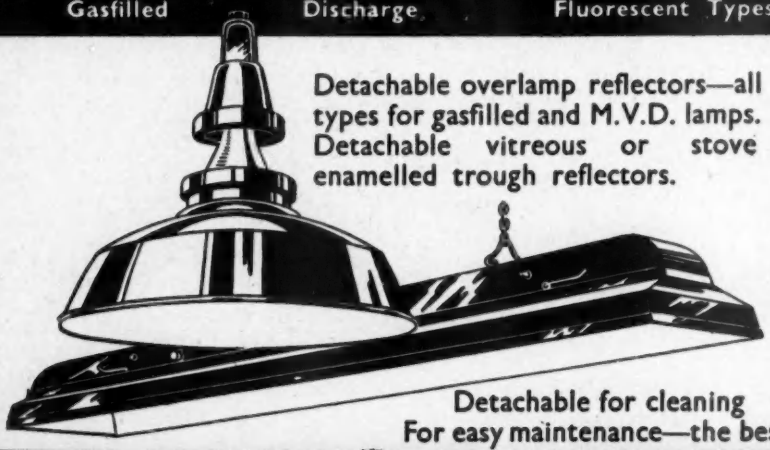

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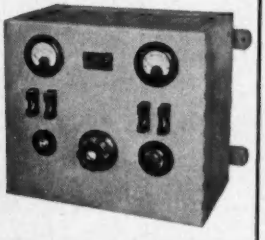

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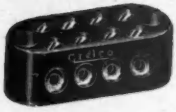

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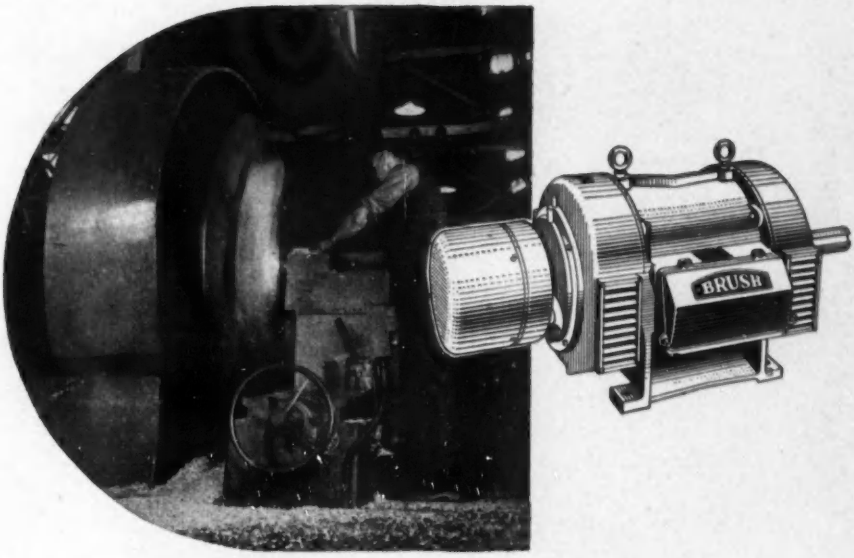

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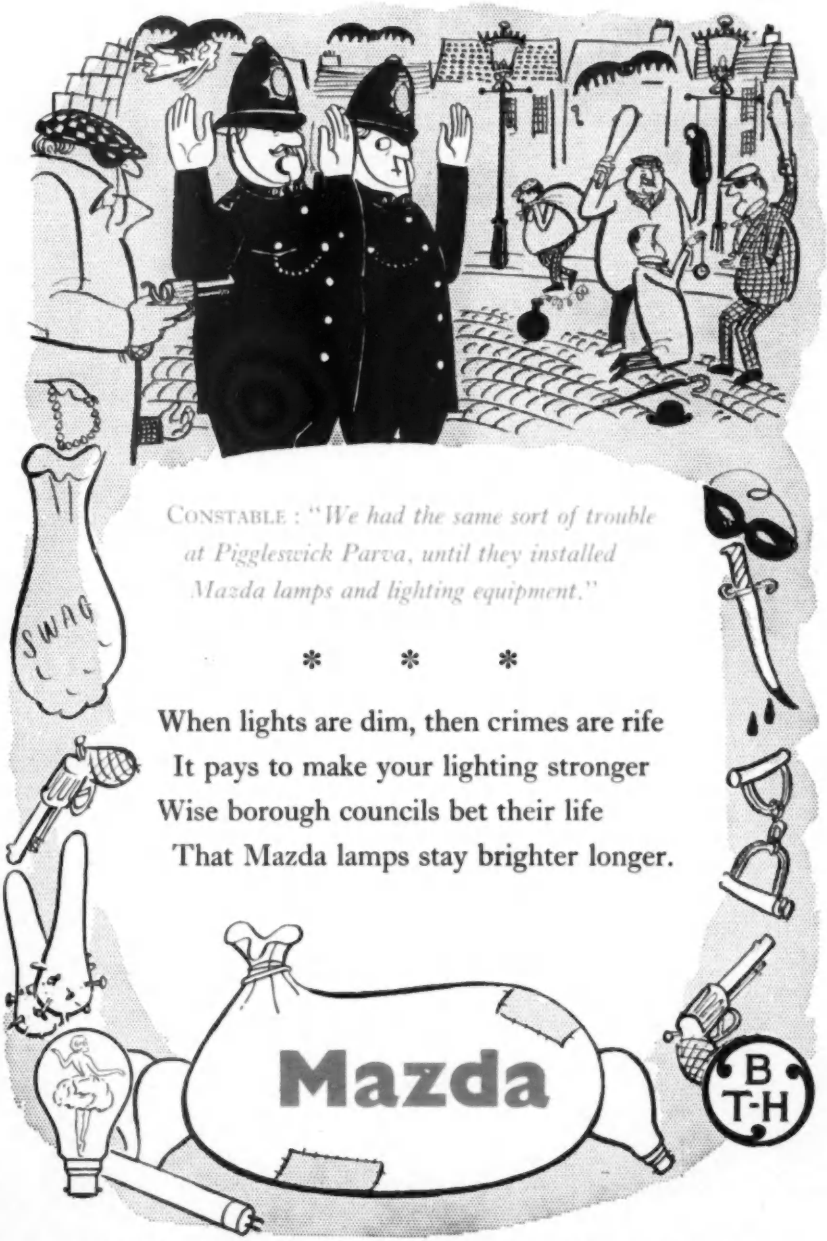

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